

ANGLIA RUSKIN UNIVERSITY

FACULTY OF BUSINESS AND LAW

VISUAL ATTENTION IN A PUB: HOW IT IS INFLUENCED
BY VENUE FAMILIARITY AND SHOPPER GOALS, AND
ITS EFFECT ON CONSUMER CHOICE

NATALIIA BOBROVA

A thesis in partial fulfilment of the
requirements of Anglia Ruskin University
for the degree of
Doctor of Philosophy following progression from MPhil
Marketing, Enterprise and Tourism

Submitted: June 2019

ACKNOWLEDGEMENTS

I am extremely grateful to Tim Froggett for being the reason I love marketing, for introducing me to the visual attention research, for his invaluable help throughout this journey. I would like to acknowledge the amazing support and guidance provided by Dr Nektarios Tzempelikos. I am also thankful for their help to Dr Mike Pake and Professor Peter Bright.

This project was made possible by the funding provided by the Faculty of Business and Law of Anglia Ruskin University.

ANGLIA RUSKIN UNIVERSITY

ABSTRACT

FACULTY OF BUSINESS AND LAW

DOCTOR OF PHILOSOPHY FOLLOWING PROGRESSION FROM MPhil MARKETING, ENTERPRISE AND TOURISM

VISUAL ATTENTION IN A PUB: HOW IT IS INFLUENCED BY VENUE FAMILIARITY AND SHOPPER GOALS, AND ITS EFFECT ON CONSUMER CHOICE

NATALIIA BOBROVA

June 2019

To date, the investigation of consumers' visual attention in real-life shopping environments has been limited to supermarket and department store retail settings. The current study aimed to expand on this knowledge by investigating the visual attention of shoppers in a different retail environment type – a pub – characterised by a range of unique features. The project tested the elements of visual attention theory in a novel environment, focusing on the influence of top-down factors (venue familiarity and shopping goals) on visual attention, and the association between visual attention and choice. The visual attention of 178 pub visitors intending to purchase beer was recorded using eye-tracking equipment. Consumers' venue familiarity, shopping goals and brand choice together with visual attention to the pub environment and beer pump-clips at the point of purchase were used to assess the theory of visual attention in a novel environment.

The results demonstrated that pub familiarity did not influence the visual attention of shoppers to its environment. However, greater familiarity significantly reduced the proportion of pump clips noticed by the shoppers and their fixation duration on the brands at the point of purchase, as well as total fixation duration on the chosen item. Similarly, having a specific goal significantly reduced shoppers' visual attention to the point of purchase. Consumers with a specific goal looked at fewer pump clips and had a lower total fixation duration; they also made fewer fixations before noting the chosen item and overall looked less at it. The results also indicated that the chosen items received longer fixation duration and more visits. The order in which consumers noticed the brands significantly and positively influenced choice. Overall, these findings provide further support for the theory of visual attention in a novel environment, with a range of theoretical and practical implications.

KEY WORDS: Visual attention, eye-tracking, real-life shopping environment, venue familiarity, goal specificity, choice

TABLE OF CONTENTS

| | |
|--------------------------------------------------------------------------|-------------|
| Acknowledgements | ii |
| Abstract | iii |
| Table of Contents..... | iv |
| List of Figures | viii |
| List of Tables..... | x |
| List of Abbreviations | xi |
| List of Appendices..... | xii |
| 1. Introduction | 13 |
| 2. Literature Review | 19 |
| 2.1. Eye movements and visual attention..... | 19 |
| 2.1.1. Human visual system | 19 |
| 2.1.2. Eye movements and visual attention | 21 |
| 2.1.3. Brief eye movement and eye-tracking research history..... | 22 |
| 2.1.4. Other techniques of measuring visual attention | 24 |
| 2.2. Theory of visual attention | 25 |
| 2.3. Theoretical framework of the study | 27 |
| 2.4. Literature review overview | 28 |
| 2.5. Familiarity – top-down factor..... | 33 |
| 2.5.1. Overall concept | 33 |
| 2.5.1.1. Familiarity | 33 |
| 2.5.1.2. Familiarity with a shopping environment..... | 34 |
| 2.5.1.3. Familiarity and visual attention..... | 35 |
| 2.5.2. Familiarity: laboratory based studies | 35 |
| 2.5.2.1. Familiarity with advertising..... | 35 |
| 2.5.2.2. Familiarity with companies, brands and product categories | 39 |
| 2.5.2.3. Familiarity with tasks and settings | 43 |
| 2.5.2.4. Summary of findings | 44 |
| 2.5.3. Familiarity: real-life shopping environment based studies | 45 |
| 2.5.3.1. Summary of findings | 48 |
| 2.5.4. Gap in the literature and hypothesis | 49 |
| 2.6. Goals – top-down factor | 50 |

| | |
|-------------------------------------------------------------------|------------|
| 2.6.1. Overall concept | 50 |
| 2.6.1.1. Goals | 50 |
| 2.6.1.2. Goals and visual attention..... | 51 |
| 2.6.2. Goals: laboratory based studies | 52 |
| 2.6.2.1. Advertising | 53 |
| 2.6.2.2. Products | 56 |
| 2.6.2.3. Summary of findings | 57 |
| 2.6.3. Goals: real-life shopping environment based studies | 57 |
| 2.6.3.1. Summary of findings | 63 |
| 2.6.4. Gap in the literature and hypothesis | 63 |
| 2.7. Choice – downstream effect | 65 |
| 2.7.1. Overall concept | 65 |
| 2.7.1.1. Choice | 65 |
| 2.7.1.2. Choice and visual attention | 65 |
| 2.7.2. Choice: laboratory based studies | 66 |
| 2.7.2.1. Advertising, catalogues and restaurant menus..... | 66 |
| 2.7.2.2. Products | 71 |
| 2.7.2.3. Supermarket shelves and point of purchase displays | 75 |
| 2.7.2.4. Summary of findings | 80 |
| 2.7.3. Choice: real-life shopping environment based studies | 81 |
| 2.7.3.1. Summary of findings | 85 |
| 2.7.4. Gap in the literature and hypothesis | 85 |
| 2.8. Summary..... | 87 |
| 3. Methodology..... | 88 |
| 3.1. Research philosophy | 88 |
| 3.1.1. Ontology | 88 |
| 3.1.2. Epistemology..... | 90 |
| 3.1.3. Research approach..... | 93 |
| 3.2. Research design..... | 94 |
| 3.2.1. Research design purpose | 94 |
| 3.2.2. Research method..... | 95 |
| 3.2.3. Research strategy | 97 |
| 3.2.4. Data collection techniques | 105 |
| 3.2.5. Research location | 110 |
| 3.2.6. Sampling | 111 |
| 3.3. Data collection..... | 114 |
| 3.3.1. Research location | 115 |
| 3.3.2. Participants | 118 |

| | |
|-------------------------------------------------------------------------------------------------------------------|------------|
| 3.3.3. Stimuli..... | 119 |
| 3.3.4. Equipment | 120 |
| 3.3.5. Measures | 121 |
| 3.3.5.1. Familiarity | 121 |
| 3.3.5.2. Goal..... | 122 |
| 3.3.5.3. Percentage of AOIs seen..... | 122 |
| 3.3.5.4. Total fixation duration..... | 122 |
| 3.3.5.5. Visit count..... | 122 |
| 3.3.5.6. First fixation on final choice..... | 123 |
| 3.3.6. Procedure..... | 123 |
| 3.4. Research design quality | 124 |
| 3.4.1. Validity..... | 125 |
| 3.4.2. Reliability..... | 127 |
| 3.5. Data analysis | 129 |
| 3.5.1. Results | 131 |
| 3.5.1.1. Familiarity and visual attention..... | 133 |
| H1a: Greater familiarity with the pub venue reduces visual attention to the in-store environment..... | 134 |
| H1b: Greater familiarity with the pub venue reduces visual attention to beer brands at the point of purchase..... | 136 |
| 3.5.1.2. Goals and visual attention..... | 141 |
| H2: A specific shopping goal reduces visual attention to beer brands at point of purchase..... | 142 |
| 3.5.1.3. Visual attention and choice | 146 |
| H3: Increased visual attention to a brand leads to an increased likelihood of it being chosen..... | 146 |
| 3.5.2. Additional findings | 149 |
| 4. Discussion..... | 151 |
| 4.1. Discussion of findings | 152 |
| 4.1.1. Familiarity and visual attention to the pub environment..... | 152 |
| 4.1.2. Familiarity and visual attention to brands..... | 154 |
| 4.1.3. Goals and visual attention..... | 156 |
| 4.1.4. Visual attention and choice | 158 |
| 4.2. Implications | 161 |
| 4.2.1. Implications for theory | 161 |
| 4.2.1.1. Shopping environment familiarity and visual attention..... | 161 |
| 4.2.1.2. Goals and visual attention..... | 165 |
| 4.2.1.3. Visual attention and choice | 168 |

| | |
|--------------------------------------------------------------------------------------------------------------------------|------------|
| 4.2.1.4. Methodology – retail environment, procedure and measurements | 170 |
| 4.2.2. Implications for practice | 172 |
| 4.2.2.1. Pub managers and owners | 172 |
| 4.2.2.2. Brand managers..... | 174 |
| 4.3. Limitations | 176 |
| 4.4. Future research | 178 |
| 5. Conclusions | 181 |
| 6. References..... | 183 |
| 7. Appendices..... | 199 |
| 7.1. Questionnaire | 199 |
| 7.2. Data analysis outputs from R per hypothesis | 200 |
| 7.2.1. H1a: Greater familiarity with the pub venue reduces visual attention to the in-store environment..... | 200 |
| 7.2.1.1. Proportion of AOIs seen..... | 200 |
| 7.2.1.2. Visit count..... | 200 |
| 7.2.2. H1b: Greater familiarity with the pub venue reduces visual attention to beer brands at the point of purchase..... | 201 |
| 7.2.2.1. Proportion of AOIs seen..... | 201 |
| 7.2.2.2. Total fixation duration..... | 202 |
| 7.2.2.3. First fixation on final choice..... | 203 |
| 7.2.2.4. Total fixation duration on a chosen product..... | 204 |
| 7.2.3. H2: A specific shopping goal reduces visual attention to beer brands at point of purchase..... | 204 |
| 7.2.3.1. Proportion of AOIs seen..... | 204 |
| 7.2.3.2. Total fixation duration..... | 205 |
| 7.2.3.3. First fixation on final choice..... | 205 |
| 7.2.3.4. Total fixation duration on a chosen product..... | 206 |
| 7.2.4. H3: Increased visual attention to a brand leads to an increased likelihood of it being chosen..... | 207 |
| 7.2.4.1. Total fixation duration on a chosen vs non-chosen product | 207 |
| 7.2.4.2. Visit count on a chosen vs non-chosen product | 207 |
| 7.2.4.3. Noting order | 208 |

LIST OF FIGURES

| | |
|---------------------------------------------------------------------------------------------------------|-----|
| Figure 1: Eye structure..... | 19 |
| Figure 2: The distribution of rods and cones | 20 |
| Figure 3: Picture of IR reflection from the cornea and centre of the pupil | 24 |
| Figure 4: Theory of visual attention..... | 26 |
| Figure 5: Theoretical framework of the study | 28 |
| Figure 6: Continuum of ontological positions..... | 89 |
| Figure 7: Continuum of epistemologies | 90 |
| Figure 8: The Tram Depot venue | 116 |
| Figure 9: The Tram Depot – schematic view of the bar | 116 |
| Figure 10: The Carpenters Arms venue | 117 |
| Figure 11: The Carpenters Arms – schematic view of the bar..... | 117 |
| Figure 12: All Bar One venue..... | 118 |
| Figure 13: All Bar One – schematic view of the bard..... | 118 |
| Figure 14: Eye-tracking glasses..... | 120 |
| Figure 15: Defining fixations | 130 |
| Figure 16: Gender of participants..... | 131 |
| Figure 17: Gender composition between venues | 132 |
| Figure 18: Participants age | 132 |
| Figure 19: Frequency of venue visits | 133 |
| Figure 20: Frequency of venue visits between pubs | 134 |
| Figure 21: Percentage of AOIs seen – mean and standard deviation per group | 135 |
| Figure 22: Visit count – mean and standard deviation per group..... | 136 |
| Figure 23: Percentage of AOIs seen – mean and standard deviation per group | 137 |
| Figure 24: Total fixation duration – mean and standard deviation per group | 138 |
| Figure 25: First fixation on final choice – mean and standard deviation per group | 139 |
| Figure 26: Total fixation duration on a chosen product – mean and standard deviation per group | 140 |
| Figure 27: Frequency of consumers with specific vs ambiguous goal | 141 |
| Figure 28: The distribution of specific vs ambiguous goals between venues..... | 142 |
| Figure 29: Percentage of AOIs seen – mean and standard deviation per group | 143 |
| Figure 30: Total fixation duration – mean and standard deviation per group | 144 |
| Figure 31: First fixation on final choice – mean and standard deviation per group | 144 |
| Figure 32: Total fixation duration on a chosen product – mean and standard deviation per group | 145 |

| | |
|--------------------------------------------------------------------------------------------------------------------|-----|
| Figure 33: Total fixation duration on a chosen vs non-chosen product – mean and standard deviation per group | 147 |
| Figure 34: Visit count on a chosen vs non-chosen product – mean and standard deviation per group | 148 |
| Figure 35: Percentage of chosen items noted in a specific order | 149 |

LIST OF TABLES

| | |
|-------------------------------------------------------------------------------------------------------------------------|-----|
| Table 1: Distinguishing features of a pub environment compared to a supermarket or other retail store environment | 15 |
| Table 2: Types of eye movements, their typical duration, amplitude and velocity | 21 |
| Table 3: Literature review summary – familiarity and visual attention..... | 30 |
| Table 4: Literature review summary – goals and visual attention | 31 |
| Table 5: Literature review summary – visual attention and choice | 32 |
| Table 6: Features of two main epistemological paradigms..... | 91 |
| Table 7: Comparison of quantitative and qualitative research methods..... | 96 |
| Table 8: The number of AOIs and brands at the bar | 120 |

LIST OF ABBREVIATIONS

| | |
|------|---------------------------------|
| AOI | Area of Interest |
| FMCG | Fast Moving Consumer Goods |
| HSD | Honestly Significant Difference |
| IR | Infrared |
| MS | Millisecond |
| POP | Point of Purchase |
| RQ | Research Question |
| UK | United Kingdom |
| US | United States |

LIST OF APPENDICES

| | |
|----------------------------------------------------------------|-------------------|
| <i>Questionnaire.....</i> | <i>199</i> |
| <i>Data analysis outputs from R per hypothesis.....</i> | <i>200</i> |

1. INTRODUCTION

Marketing is a visual discipline. Consumers encounter hundreds of visual marketing stimuli everyday – brand identities, advertising across multiple mediums, products themselves and their packaging (Wedel and Pieters, 2008b). These stimuli are used to achieve different strategic objectives, such as to make consumers aware of a specific product, communicate a product's benefits over those of competitors, or let consumers know where a product can be purchased – all with the aim of encouraging consumers to make a purchase and generate income for the company. For some high value purchases such as a house or a car, consumers may obtain information provided by companies through a lengthy information search process, collecting and evaluating multiple sources of information, in order to make the best decision (Blackwell, Miniard and Engel, 2006). Yet, it would take too much effort for shoppers to engage in a similar information search process for low value purchases such as products bought during a regular grocery shopping trip.

Consumers make 82% of their purchase decisions in-store (POPAL, 2014). When purchasing fast moving consumer goods (FMCG), these decisions are often made within seconds and without much cognitive effort (Clement, Kristensen and Grønhaug, 2013). Given the limited window of opportunity during which a product can be noted and a high volume of decisions made in-store, it is crucial to understand the visual behaviour of shoppers and investigate what drives their visual attention, and how it influences subsequent purchase decisions. This research area remains under-researched academically, which is surprising given that marketing is a visual discipline (Wedel and Pieters, 2008a).

Visual attention to products and consumer decision-making has been investigated commercially. In their review of in-store marketing research, Hendrickson and Ailawadi (2014) noted that the lead author and his colleagues have been conducting proprietary visual marketing research since 2008. However, due to the commercial sensitivity of the results, only a few studies have been published based on proprietary results, whereas the substantial time and high costs of carrying out the research have deterred academic investigators (Chandon et al., 2008). This has resulted in limited research on visual attention in the area of marketing.

Most of the published research examining visual attention in the field of marketing has been conducted in a laboratory (artificial) environment using advertisements, images of products and images of supermarket shelves as stimuli, with fewer studies carried out

in a real environment. The difference in the volume of research has historically been driven by the technological limitations of the eye-tracking equipment used to measure visual attention. Technological developments in this equipment in the last decade have enabled valid visual attention research to be performed outside laboratories in real shopping environments (Orquin and Holmqvist, 2018). Although laboratory-based research has provided crucial findings, and laboratories are an important setting for some research projects, researchers have long noted that consumers' visual behaviour in an artificial environment is likely to be different to their behaviour in a real environment. Russo and Leclerc (1994), early visual attention researchers, noted that hypothetical purchases and the presence of the researcher in a laboratory setting made consumers utilise a more deliberate choice process. The researchers highlighted that in laboratory-based studies examining choice, participants spent twice as much time choosing a product than they did in a real supermarket.

Additionally, subsequent research showed that different research methodologies used to study visual attention in artificial research settings influence the visual behaviour of respondents. Tonkin, Ouzts and Duchowski (2011) examined consumers' performance in searching for a cereal box on a projected image of a retail store shelf compared with a physical, real mocked-up shelf of cereal boxes. The study concluded that although the physical size of the items was the same in both cases, consumers found the target item significantly faster when looking at the real shelf and exhibited a different search pattern. This further demonstrated that the way stimuli are presented can influence shoppers' visual attention. Other characteristics of real-life shopping environments, such as sounds, smells, other shoppers and staff, have the potential to influence the behaviour of shoppers but are hard to replicate in a laboratory environment (Turley and Milliman, 2000). These observations and findings imply that the visual behaviour of consumers observed in a laboratory environment may differ from that exhibited in a real environment, highlighting the need for further investigation.

A recent review of studies that researched visual attention in a real shopping environment conducted by Huddleston et al. (2018) noted the limited amount of research in the area and identified the need to investigate visual attention in real-life, complex environments. The literature review conducted in the current project revealed that the studies carried out in a real environment were predominantly based in a supermarket, with a few exceptions based in a department store, a sports store and a gas station. As consumers are likely to visit a myriad of types of shopping environments, such as bookstores, drugstores, coffee shops, fast food restaurants, and pubs, that are characterised by unique features, it is important to understand whether

the findings from one type of shopping environment can be generalised to other types of shopping environments.

Therefore, the aim of the current project is to address the dearth of research on visual attention in a real shopping environment and undertake research in a pub – a setting frequented by 90 percent of adult population in the United Kingdom (Mintel, 2019). Compared with a supermarket or a retail store, a pub environment is characterised by a range of unique features, summarised in Table 1. The major difference of a pub is the presence of a service element – consumers can ask for advice or recommendations and need to place an order rather than just pick a product they like. These differences between the retail settings are likely to influence the behaviour of consumers. Thus, the current project aims to fill the gap in the research by assessing visual attention in a new shopping environment – a pub.

| | |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General environment | <ul style="list-style-type: none"> • Has a service element – staff are present to offer advice or recommendations, or to take an order • Physical proximity of other consumers – often the need to queue • Other consumers may have a greater influence on choice • Lighting conditions are often suboptimal – in a supermarket the environment is lit, while in a pub the products at the bar tend to receive less light |
| Products | <ul style="list-style-type: none"> • Shoppers cannot touch or pick up products for further examination / products are difficult to evaluate, classified as experience goods (Rama, 2011) • Consumers cannot view closely some of the products (for example, if items from the back of bar are chosen) |
| Point of purchase | <ul style="list-style-type: none"> • There is little, if any, point of purchase information, including price • A brand – especially with beer pump clips – most commonly has one facing |
| Ordering process | <ul style="list-style-type: none"> • Consumers need to wait in a queue to ask a question • Consumers may feel like they are under time pressure to make a choice if they are at the front of the queue |

Table 1: Distinguishing features of a pub environment compared to a supermarket or other retail store environment

The theory of visual attention poses that visual attention is affected by top-down and bottom-up factors, and has an influence on downstream marketing effects (see the Theory of visual attention section in the following chapter for more details). The current project aimed to partially investigate these relationships in a pub environment and assessed how top-down consumer characteristics influence visual attention of

shoppers and how visual attention is related to choice. The study examined three research questions, which were guided by gaps in the literature identified by previous authors.

The first research question of the current project built on the suggestion by Huddleston et al. (2018) that future research should investigate how store environment influences visual attention. The researchers also noted that prior product usage is likely to influence consumers' visual patterns. Hence, the current study aimed to combine these ideas and investigate how familiarity with a real-life store environment influences visual attention of consumers to the environment itself and to the products at the point of purchase.

This research question has been partially investigated in a supermarket setting. Otterbring et al. (2014) showed that familiarity with a supermarket did not have an influence on visual attention to in-store signs – an element of the shopping environment. Clement, Kristensen and Grønhaug (2013) showed that increased familiarity with an environment reduced shoppers' attention to the products at the point of purchase in a supermarket, whereas Gidlöf et al. (2017) reached the contrary conclusion, failing to identify a link between familiarity and attention. Therefore, the current project contributed to knowledge by investigating the link between venue familiarity and visual attention in a novel research setting and added to a limited body of literature that examined the relationship in a real-life setting.

The second research question was guided by Otterbring et al. (2014) who noted that future research should examine how goal specificity influences visual attention in a real shopping environment. Thus, this study set out to examine how a characteristic of a shopping goal influences consumers' visual attention to products in a real shopping environment.

Prior research has examined the relationship between goal types and visual attention in a supermarket and gas station store. Clement (2007) provided an indication that consumers with a specific goal noticed fewer products at the point of purchase. Wästlund et al. (2015) carried out multiple experiments but reached contradictory results. In one experiment consumers with a specific goal noted fewer products, whereas in another one a contrasting result was found. Therefore, as for the second research question, the current project contributed to knowledge by studying how consumer goals influence visual attention in a new research setting. The study also provided further evidence on how goals affect visual attention in a real environment, contributing to a limited amount of research on this topic.

The third and final research question aimed to provide further empirical evidence of the relationship between visual attention and choice. Pieters and Warlop (1999) noted that both marketing practitioners and academics believed that more attention to a product increased the chances of it being chosen. Subsequent researchers called for an empirical investigation of the influence of visual attention on downstream effects – such as memory, consideration and choice (Pieters and Wedel, 2004; Wedel and Pieters, 2008a; Clement, Kristensen and Grønhaug, 2013; Huddleston et al., 2018). Hence, the current project aimed to examine the relationship between visual attention and product choice in a real-life shopping environment.

Limited research has examined how visual attention and choice are linked in a real-life supermarket environment. Clement (2007) found no difference in consumers' visual attention between chosen and non-chosen products. Similarly, Otterbring et al. (2014) showed that early visual attention to a product did not influence its choice likelihood. However, Hendrickson and Ailawadi (2014) showed a positive weak correlation between visual attention and choice, while Gidlöf et al. (2017) concluded that longer visual attention strongly predicts choice. The current project contributed to knowledge by investigating the relationships between visual attention and choice in a novel retail environment and added insights to the mixed research findings conducted in a real-life environment.

Therefore, the current study aimed to examine the elements of visual attention theory in a novel, real-life research environment and addressed the gaps in the current literature by investigating the following research questions:

- 1a. Does familiarity with the pub venue (top-down factor) affect the distribution of visual attention to the environment?
- 1b. Does familiarity with the pub venue (top-down factor) affect visual attention to brands?
2. Does shopping goal (top-down factor) affect visual attention to brands?
3. Is there a relationship between visual attention and brand choice?

As this project was conducted in a pub, the RQ1a investigated visual attention to the pub environment. To address the other research questions, a draught beer product category was chosen, as this product is consistently present in pubs and prominently positioned at the bar.

In order to investigate the research questions, the visual attention of pub-visitors was recorded using the eye-tracking equipment. A large sample of 178 consumers intending to buy beer in three pubs (two in London and one in Cambridge) were invited

to take part in the research project in order to investigate their visual attention patterns. Their familiarity with the visited venue, shopping goals and choice, together with visual attention data, were used to investigate and answer the research questions.

The current research project defines a real-life shopping environment as a physical environment in which the business operates with data collected during business hours resulting in a product choice and purchase. All other environments – a store mock-up with no consumers or staff, virtual stores, projected images of aisles or real-life shelves with products – are defined as being a laboratory or an artificial setting. The definition is driven by Huddleston et al. (2018), who stated that a real store is a complex environment with a myriad of visual stimuli, sounds and smells strategically thought through by a retailer that are hard to replicate in a laboratory. Further elements of the real environment such as other shoppers, staff members and electronic devices, may influence consumers' visual attention and characterise real shopping experience.

Additionally, the current project aimed to investigate visual attention to products at the point of purchase. The beer product category was chosen due to its prominent presence in pub environments. The study focused on all draught beers featured at the bar, including those being served through a hand pump or a tap. The branding element of the tap is referred to as the keg badge, while the branding item on a hand pump is referred to as a pump clip. However, for simplicity, the current project used the term "pump clip" to refer to any branding element that informed what product was available at each tap. Lastly, although some literature has treated brands and products as distinct concepts, the current study uses the terms interchangeably to refer the studied items at the point of purchase.

The current work comprises three main sections. The first section, a literature review, outlines the literature relevant to the current project and proposes hypotheses to be tested to address the research questions. The next part – methodology – describes the theoretical assumptions underpinning the current project, states how the data were collected and provides the analysis that was undertaken. The third main section – discussion – showcases the findings of the current project, describes their theoretical and practical implications, and outlines the limitations and future research suggestions. Lastly, a brief summary of the project is provided.

2. LITERATURE REVIEW

The aim of the current project was to investigate shoppers' visual attention in a real-life pub environment. More specifically, the research set out to examine how venue familiarity and shopping goal influence consumers' visual attention and how visual attention and choice are associated. The current section overviews and examines the existing literature that has investigated these questions in order to generate research hypotheses to be tested in the current project.

The current chapter starts by discussing the intricacy of the human visual system, which enables the quantification of visual attention and thus visual attention research. Subsequently, a literature review is presented, arranged into three sections to address each research question – familiarity, shopping goal and choice. Lastly, a brief summary and hypotheses to be tested in the project are presented.

2.1. EYE MOVEMENTS AND VISUAL ATTENTION

This section outlines the structure of the human eye and the need for eye movements, introduces the history of eye movement research and summarises the relationship between eye movements and visual attention.

2.1.1. HUMAN VISUAL SYSTEM

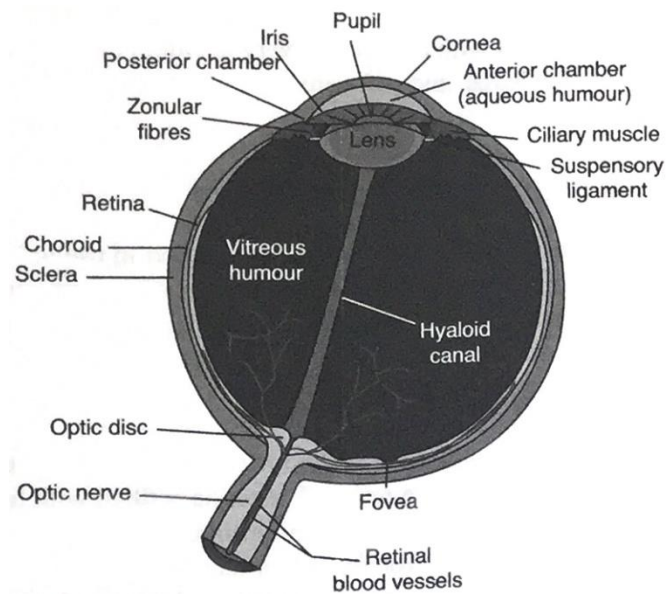


Figure 1: Eye structure (Holmqvist et al., 2011, p.22)

The human eye collects the light reflected from objects and projects it onto the retina – a thin layer (0.5 mm to 0.1 mm thick) at the back of the eye, as shown in Figure 1

(Hecht, 2002). The retina is covered in two types of photoreceptive cells – rods and cones – that turn the light into electrical signal which is subsequently processed by the visual cortex, a region of the brain (Holmqvist et al., 2011). Rods are extremely light sensitive, but only provide low resolution, black and white vision (Hecht, 2002). Cones on the other hand require bright light to operate but provide highly acute, colour vision (Hecht, 2002). While rods cover most of the retina, cones are concentrated in a small region (about 0.3 mm in diameter) called the fovea located directly opposite the lens (Hecht, 2002; Pieters and Wedel, 2007). The schematic depiction is shown in Figure 2.

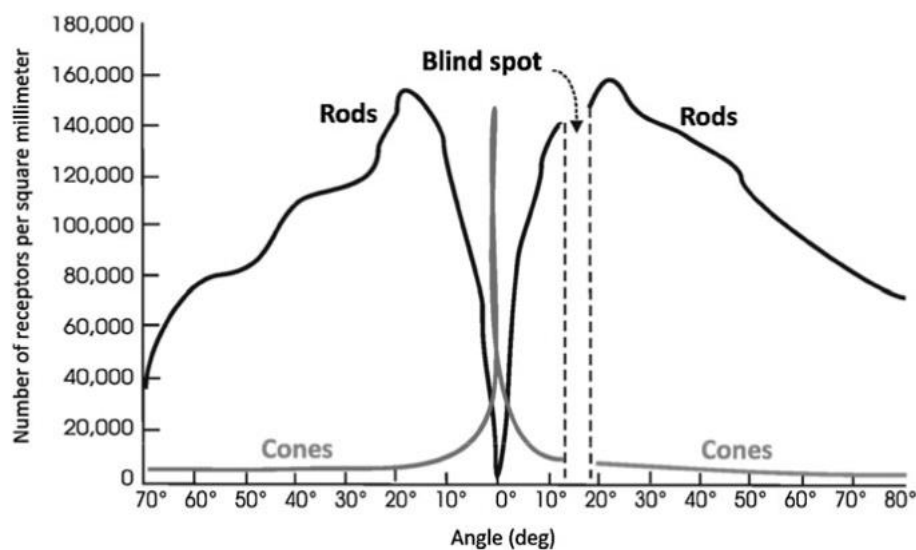


Figure 2: The distribution of rods and cones (Majaranta and Bulling, 2014, p.41)

Humans have the impression that they can see the whole visual scene in colour and high resolution (Loschky et al., 2017). Yet while people's visual field spans around 200°, only about 2° of the visual scene that falls onto the fovea is processed in high acuity (Chandon et al., 2008; Levin et al., 2011). A common way of visualising this distance is to say that it is equal to the area of a thumbnail at an arm's length (Holmqvist et al., 2011). Computational models have estimated that if human eyes took in all available information at once, the brain would not have the capacity to process it (Tsotsos, 1990). Hence the need to evolve a visual system where only a small area requires high processing power of the brain.

Due to this anatomical structure, humans need to constantly move their eyes in order to project the light onto the fovea (Holmqvist et al., 2011). Eye movements appear fluid and people do not consciously notice them. However, they consist of two main elements – fixations and saccades. A fixation is not technically a movement, but a moment when the eye stays relatively still for a period of time between tens of milliseconds to a few seconds (Holmqvist et al., 2011). During this time the light falls

onto the fovea for detail processing (Wedel and Pieters, 2008a). Saccade is an extremely fast, ballistic eye movement – the fastest in the human body – which occurs when the eyes move from one fixation to another and typically lasts between 30 and 80 milliseconds (Wedel and Pieters, 2008a; Holmqvist et al., 2011). The vision is suppressed during saccades, so people rely on fixations to process the visual scene (Pieters and Wedel, 2008). The researchers define a range of additional eye movements, summarised in Table 2, which are compared with fixations and saccades in terms of duration, amplitude and velocity.

| Type | Duration (ms) | Amplitude | Velocity |
|----------------|---------------|-----------|---------------|
| Fixation | 200 – 300 | – | – |
| Saccade | 30 – 80 | 4 – 20° | 30 – 500° /s |
| Glissade | 10 – 40 | 0.5 – 2° | 20 – 140° /s |
| Smooth pursuit | – | – | 10 – 30° /s |
| Microsaccade | 10 – 30 | 10 – 40' | 15 – 50° /s |
| Tremor | – | < 1' | 20' /s (peak) |
| Drift | 200 – 1000 | 1 – 60' | 6 – 25' /s |

Table 2: Types of eye movements, their typical duration, amplitude and velocity (Holmqvist et al., 2011, p.23)

2.1.2. EYE MOVEMENTS AND VISUAL ATTENTION

It has been shown that a single brief exposure to a visual scene or a single fixation is enough for a person to get the general gist of a scene (Biederman, Mezzanotte and Rabinowitz, 1982; Rayner, 1998). Visual attention guides the subsequent fixations to some parts of the scene – whether due to their visual prominence or their relevance to the search task (Duchowski, 2007; Banović, Rosa and Gamito, 2014). Visual attention is defined in the literature as the “operation producing a localized priority in information processing – an attentional ‘window’ or ‘spotlight’ that locally improves the speed and reduces the threshold for processing events” (Fischer and Weber, 1993, p.575). Hence, when a person attends to an object, the processing of it is enhanced, while the processing of other elements in the scene – is suppressed (Pieters and Wedel, 2008). Visual attention helps to identify informative parts of the visual scene, filters out relevant and irrelevant information and guides eye movements to those areas (Banović, Rosa and Gamito, 2014).

In marketing, visual attention is used to create visual lift, which is “incremental consideration caused by in-store visual attention” (Chandon et al., 2008, p.225). Given the abundance of choice in some product categories, it becomes invaluable to grab consumers’ attention. The use of techniques to attract the visual attention of consumers is called visual marketing, which is defined as “the strategic utilization by firms of commercial and non-commercial visual signs and symbols to deliver desirable and/or useful messages and experiences to consumers” (Wedel and Pieters, 2008b, p.2).

Although research has shown that simple stimuli can be processed using peripheral, non-foveal vision (covert attention), for complex tasks such as reading and visual search humans need to move their eyes (Posner, 1980; Rayner and Castelhamo, 2008). A real-life shopping environment such as a supermarket features hundreds of different products, making it a complex, cluttered environment for humans to process using peripheral vision only (Chandon et al., 2009). Thus, consumers need to move their eyes to attend to stimuli during shopping tasks and researchers can assess their visual attention by measuring their eye movements. Therefore, the eye movements of consumers examining marketing stimuli and shopping environments can be measured to assess their visual attention.

2.1.3. BRIEF EYE MOVEMENT AND EYE-TRACKING RESEARCH HISTORY

The dominant way of measuring eye movements is using the eye-tracking method. Eye-tracking is defined as “the process of tracking eye movements or the absolute point of gaze (POG) – referring to the point the user’s gaze is focused at in the visual scene” (Majaranta and Bulling, 2014, p.40). The structure of the human eye described in the previous section makes it possible to measure and quantify visual attention using the eye-tracking process.

Vision and the way visual system works have fascinated researchers for millennia. Aristotle (384 BC – 322 BC) observed the binocularity of eye movements and outlined diplopia (double vision) caused by strabismus (incorrect alignment of the eye), and Ptolemy conducted experiments with binocular vision (Wade, 2010). However, researchers over the years have tended to focus on abnormal, rather than healthy, ocular behaviour (Wade, 2010). As a result, the basic components of eye movement – fixations and saccades – were described in the literature much later than characteristics of nystagmus (involuntary eye movements) (Wade, 2015).

Early eye movement research focused on self-observation and naked eye observations. Subsequently, researchers started to use afterimages induced by a bright light to estimate eye movements and observed them using mirrors, special goniometers and various optical instruments such as magnifying glass and microscopes to study large and small eye movements (Yarbus, 1965). This method had a number of disadvantages. In most cases, it relied on participants accurately reporting their own eye movements (Wade, 2010) and the quality of the data was a factor of respondents' memory span (Dodge, 1906).

To address the disadvantages of research methods of the time and to make eye movement research more objective, a range of mechanical solutions were developed. Hering and Lamare in 1879 used a technique of listening to the sounds of extraocular muscles while a respondent was reading by placing tubes over their eyelids (Wade, 2010). Other researchers attached mirrors to respondents' eyes and recorded light reflections on light sensitive paper (Yarbus, 1965). Later, there were attempts to take still pictures and recordings of the eye to study eye movements (Yarbus, 1965).

While mechanical devices brought more objectivity to eye movement research, the techniques frequently required equipment to be attached directly to the surface of the eye or the eyelid, or to use contact lenses to make the data collection possible (Westheimer, 2007; Yarbus, 1965). Contact with the eye tended to put pressure on the eye and hence affected participants' eye movements (Wade, 2010). The resulting data were low in accuracy, and the eye-tracking procedure was quite complex (Yarbus, 1965).

Researchers worked on overcoming the disadvantages of mechanical eye-trackers, and at the beginning of the 20th century, Dodge developed a non-invasive, standalone eye-tracker that did not require contact with the eye (Wade, 2010). His device relied on bouncing the light off the cornea and directing the reflection onto a photographic plate (Richardson and Spivey, 2008). Although this eye-tracking set up was not precise enough to study small eye movements, the invention led to a sharp increase in the volume of eye movement research (Wade, 2010). Similar systems were used until 1970s, when they were replaced by the video based, corneal reflection eye-trackers that dominate today (Richardson and Spivey, 2008; Holmqvist et al., 2011). These eye-trackers shine an infrared (IR) light beam into the eye and capture the reflection using a video recording, as shown in Figure 3. The difference between the centre of the pupil and corneal reflection enables estimation of the gaze direction of a respondent (Majaranta and Bulling, 2014).

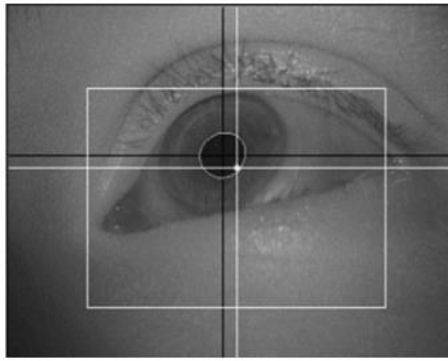


Figure 3: Picture of IR reflection from the cornea and centre of the pupil (Majaranta and Bulling, 2014, p.44)

The first research using eye-tracking in the field of marketing is believed to have been conducted in 1924 by Nixon (cited in Wedel, Pieters and Liechty, 2008), who studied visual attention to advertisements. More thorough research began in the 1960s, when advertising processing was investigated by Robinson (1963 cited in Radach et al., 2003) and Starch (1966).

Apart from marketing, eye-tracking is used in multiple disciplines – psychology, medicine, computer science – to study a wide range of research questions (Majaranta and Bulling, 2014). While eye-tracking as a method has a long history, it has become more popular in the field of marketing only recently, which is surprising given the abundance of visual stimuli used by practitioners – packaging, print advertising, point of purchase displays, etc. (Wedel and Pieters, 2008a).

2.1.4. OTHER TECHNIQUES OF MEASURING VISUAL ATTENTION

Currently, eye-tracking is the dominant method of measuring visual attention. Yet in the 20th century it was a niche technique, primarily due to the stand that academic theory took on visual attention. The concept of visual attention was not identified as important in the information acquisition process. It was believed that attracting attention is easy, but that it is just an initial step to gather information and pass it on to the brain for higher-level cognitive processing (Wedel and Pieters, 2008a). Based on this theoretical framework, researchers did not use expensive and complicated eye-tracking equipment and instead relied upon self-reported recall (memory), field observations and sales to assess visual attention (Wedel and Pieters, 2008a; Otterbring et al., 2014).

The development of academic theory has shown the importance of visual attention in its own right, and subsequent research has uncovered the issues of validity in using

memory as a proxy for visual attention. The research showed that recall is biased towards chosen items; that people can choose products without ever looking at them, and look at products without remembering them (Chandon et al., 2009). In the area of print advertisement, in contrast, the assessment of visual attention using recall questioning is affected more by familiarity and past usage than by visual characteristics (Treisman and Gregg, 1979). Therefore, although historically multiple methods of measuring visual attention have been used, the eye-tracking measurement method prevails at the moment.

2.2. THEORY OF VISUAL ATTENTION

The previous sections outlined the anatomical structure of human eyes and the resulting need for eye movements to enable the processing of complex visual scenes. As only a small subset of a visual scene can be processed at a time, humans need to make multiple eye fixations to process complex visual scenes. The location and order of those fixations are influenced by two mechanisms affecting visual attention – top-down and bottom-up (Wedel and Pieters, 2008a). Top-down features (also called out-of-store factors) are elements that are customer specific, such as demographics, familiarity, involvement, goals and heterogeneity (Wedel and Pieters, 2006). Bottom-up mechanisms (or in-store factors) are particular physical elements of stimuli and their surroundings, such as size, colour, edges, position, movement, imagery and competition (Wedel and Pieters, 2006). Both top-down and bottom-up factors influence visual attention, which subsequently influences downstream effects such as consideration, choice and memory, as shown in Figure 4.

During a typical visual search task, such as finding a product in a supermarket aisle, consumers' visual attention alternates between two states – localisation and identification – with different regions of the brain used to process the information at each stage (Itti and Koch, 2000). Consumers start the visual search in a localisation stage (Clement, Aastrup and Charlotte Forsberg, 2015). During the localisation stage, low-level information about the visual scene is gathered using peripheral vision, which is fast although lacks accuracy. The information is then processed in parallel to identify “where” (a stage in the model) a potential target could be located and where subsequent more detailed visual processing needs to take place (Clement, 2007).

During the localisation stage, the brain separates the input it receives from the retina into feature maps based on colour, luminance and edges and constructs a weighted saliency map that topographically represents the visual salience of the scene (Itti, Koch and Niebur, 1998). The model suggests that the most salient element is looked at first,

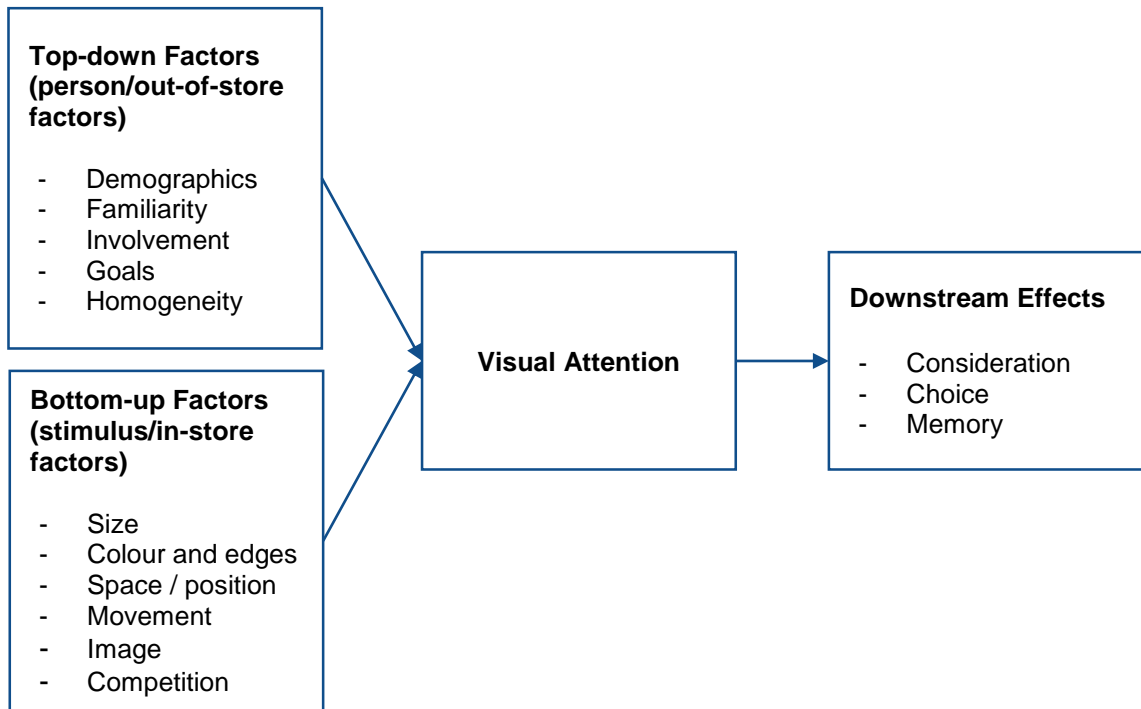


Figure 4: Theory of visual attention (based on Wedel and Pieters, 2006)

followed by the next most salient element and so on (Land, 2007). The bottom-up factors guide visual attention at this stage (Behe et al., 2015). An element of a scene dramatically different from its surroundings is likely to be visually salient (Van Der Lans, Pieters and Wedel, 2008a). Hence, the absolute physical characteristics of an object (i.e. its colour or size) are not enough to make it visually salient; it is the relative contrast of an object with its surroundings that makes it more or less visually salient (Wedel and Pieters, 2006). A bottle of green Heinz ketchup on a shelf surrounded by predominantly red bottles will be visually salient and immediately pop out, attracting visual attention (Wedel and Pieters, 2008a). However, in a country where a market leader has predominantly green packaging, a green Heinz ketchup bottle will not be as visually salient. However, top-down features can also influence the salience map built during the localisation stage (Lee and Mumford, 2003). If a consumer is searching for a brand with blue packaging, the blue colour will become more salient during this search process (Van Der Lans, Pieters and Wedel, 2008a).

Once a specific search target is selected, such as a product on the shelf (referred to as “what” in the model), an identification stage begins (Van Der Lans, Pieters and Wedel, 2008b). This is characterised by a slower, more efficient processing with sequential examination of attributes of the target product to assess whether it fits the search criteria (Clement, 2007). Top-down influencers of attention become crucial at this stage, as the search goal and past knowledge are likely to influence visual attention.

For example, the top-down factors enable assessment of whether the selected item meets the search criteria or if another product should be examined instead.

The influence of top-down and bottom up features on visual attention is likely to vary between tasks. Ares et al. (2013) concluded that when looking at a range of unfamiliar products, top-down factors influenced visual attention the most. However, Van Der Lans, Pieters and Wedel (2008a) concluded that during a product search from a supermarket shelf, bottom-up factors contribute about two-thirds of visual salience, while top-down factors contribute the rest. However, Higgins, Leinenger and Rayner (2014) suggested that while bottom-up features may be important during simple visual search, a search in a real world may require a more dominant effect of top-down features. For example, research into eye movements during some practical tasks such as food preparation has shown that visual attention is predominantly driven by top-down factors, with fewer than 5% of fixations on non-task relevant items (Land and Hayhoe, 2001).

Subsequently, an increase in visual attention is believed to influence downstream effects such as preference, consideration, memory and choice (Wedel and Pieters, 2008a). Prior research has demonstrated that an increase in visual attention leads to greater consideration of that product Chandon et al. (2008), memory (Chandon et al., 2009) and product choice Behe et al. (2013).

2.3. THEORETICAL FRAMEWORK OF THE STUDY

The previous subsection examined the theory of visual attention, highlighting that top-down and bottom-up factors influence visual attention, and increased visual attention influences downstream effects. The current project aimed to examine consumers' visual attention in a novel, real-life environment. Therefore, the theoretical framework of this study follows the theory of visual attention outlined in Figure 4 in order to investigate the relationship between the variables in a novel retail environment.

A real-life setting makes it hard to study bottom-up influencers of visual attention as the researchers do not have control over the products at the point of purchase or their position, which could lead to flawed conclusions. For example, a product may receive more visual attention due to its position at the point of purchase, regardless of its visual characteristics. Additionally, Higgins, Leinenger and Rayner (2014) noted that in real complex environments top-down factors have a greater influence on the visual attention of consumers. Therefore, the current project focused on researching top-down influencers of visual attention, specifically familiarity and goals, as they were

identified as features requiring further research by Huddleston et al. (2018) and Otterbring et al. (2014), respectively. Furthermore, a link between visual attention and choice was assessed – an area requiring further research, as noted by Clement, Kristensen and Grønhaug (2013).

A visual representation of the theoretical framework of the current project is depicted in Figure 5. RQ1 and RQ2, as outlined in the introduction, examine the relationship between top-down influencers (familiarity and goals) and their effect on visual attention. RQ3 examines the extent to which visual attention has an influence on choice. The rest of this chapter focuses on the three variables studied in the current project – familiarity, goals and choice.

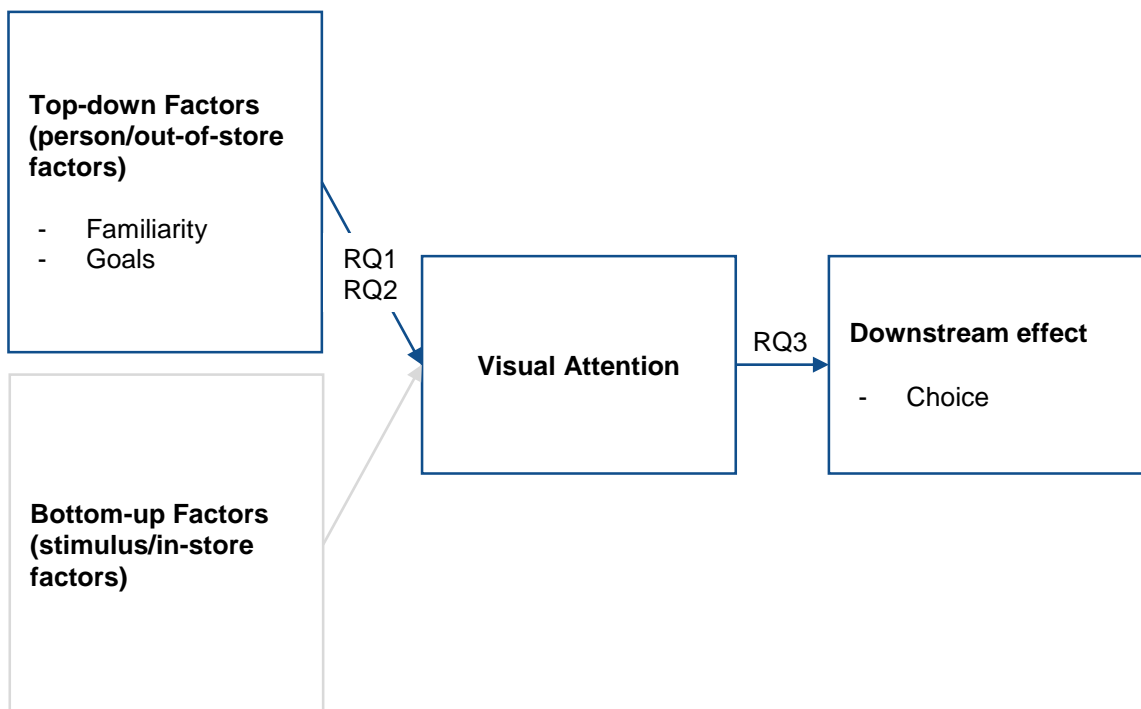


Figure 5: Theoretical framework of the study

2.4. LITERATURE REVIEW OVERVIEW

The current section reviews the existing literature on the relationships between familiarity and visual attention, goals and visual attention, and visual attention and choice. The literature review focused on studies that have directly measured visual attention using eye-tracking equipment, as it is the most dominant and accurate research tool used to investigate visual attention and enables direct comparison to the current research project.

The current study's aim was to investigate visual attention in a real environment, but only a limited amount of research has been conducted in real retail settings. As a

result, the scope of the literature review was broadened to include studies conducted in a laboratory environment with other marketing stimuli such as advertisements, products and retail shelves. However, the review excluded studies that examined website usability or virtual retail environments.

Studies examining the influence of familiarity on visual attention are shown in Table 3. The studies identified were split into two groups – those conducted in a laboratory environment and those carried out in a real life environment. Within each group, the studies were arranged chronologically by the type of familiarity researched, for example familiarity with an advertisement or familiarity with a brand. The research results established whether visual attention was found to be influenced by familiarity. Lastly, the size of each sample was noted.

Papers studying the link between goals and visual attention are summarised in Table 4. The papers were split into two groups – laboratory environment and real-life shopping environment. Research in a laboratory environment was further split into groups according to the type of marketing stimuli used – advertising or products – with studies arranged chronologically within each group. The research results noted whether each study identified the goal influencing visual attention. Finally, the sample size of each study was highlighted.

Lastly, the literature assessing the link between visual attention and choice is outlined in Table 5. A structure similar to that for the review of literature on goals was adopted. The papers were first split into groups according to the setting of the experiment – laboratory or real-life. Laboratory research was further split into three groups according to the stimuli used in the study – advertising and menus, products and retail shelves – with papers being ordered chronologically within each group. The research results were noted for each study, according to whether it found a relationship between visual attention and choice. Table 5 also states the size of the sample used in each study.

The following sections examine each of the variables in greater detail, discuss the findings and offer insights into the research hypotheses of the current project.

| | Studied familiarity with | Result: greater familiarity reduces visual attention | Sample size |
|-----------------------------------------|----------------------------|------------------------------------------------------|-------------|
| Krugman et al. (1994) | Advertising | Yes* | Large |
| Pieters, Rosbergen and Hartog (1995) | Advertising | Yes** | Small |
| Pieters, Rosbergen and Wedel (1999) | Advertising | Yes** | Large |
| Pieters, Warlop and Wedel (2002) | Advertising | Yes** | Large |
| Peterson et al. (2010) | Advertising | Yes* | Small |
| Russo and Leclerc (1994) | Category/ brands/ business | Yes** | Small |
| Lohse (1997) | Category/ brands/ business | Yes* | Small |
| Lohse and Wu (2001) | Category/ brands/ business | Yes* | Small |
| Pieters and Wedel (2004) | Category/ brands/ business | Yes** | Large |
| Chandon et al. (2009) | Category/ brands/ business | No* | Large |
| Goldberg, Probart and Zak (1999) | Setting/ task | Yes* | Small |
| Drèze and Hussherr (2003) | Setting/ task | Yes* | Small |
| Clement, Kristensen and Grønhaug (2013) | Product category/ brands | No relationship found | Small |
| | Real store | Yes* | |
| Otterbring et al. (2014) | Product category/ brands | No* | Small |
| | Real store | Yes** | Large |
| Gidlöf et al. (2017) | Product category/ brands | Yes* | Small |
| | Real store | No relationship found | |

Key:
* the measures of visual attention were statistically significant
** at least one measure of visual attention was not significant (partial support)
Study conducted in a laboratory (no colour) or real shopping environment
Small sample – under 100 respondents; large – 100 respondents or more

Table 3: Literature review summary – familiarity and visual attention

| | Stimuli | Result: goal type influenced visual attention | Sample size |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------|--------------------|
| Rayner et al. (2001) | Advertising | Yes** | Small |
| Radach et al. (2003) | Advertising | Yes** | Small |
| Pieters and Wedel (2007) | Advertising | Yes** | Large |
| Wedel, Pieters and Liechty (2008) | Advertising | Yes** | Large |
| Rayner, Miller and Rotello (2008) | Advertising | No difference found | Small |
| Chandon et al. (2009) | Products | Yes** | Large |
| Clement (2007) | Real store | No difference found | Small |
| Harwood and Jones (2014) | Real store | Yes (descriptive observation) | Small |
| Wästlund et al. (2015) | Real store | Yes** | Large |
| | Real store | Yes* | Small |
| | Real store | Yes* | Small |
| <p>Key:</p> <p>* the measures of visual attention were statistically significant</p> <p>** at least one measure of visual attention was not significant (partial support)</p> <p>Study conducted in a laboratory (no colour) or <u>real shopping environment</u></p> <p>Small sample – under 100 respondents; large – 100 respondents or more</p> | | | |

Table 4: Literature review summary – goals and visual attention

| | Stimuli | Result: higher visual attention associated with higher choice likelihood | Sample size |
|----------------------------------------|-----------------------|---------------------------------------------------------------------------------|--------------------|
| Treistman and Gregg (1979) | Advertising/ menus | Yes (descriptive observation) | Large |
| Lohse (1997) | Advertising/ menus | Yes* | Small |
| Janiszewski (1998) | Advertising/ menus | No difference found | Small |
| Lohse and Wu (2001) | Advertising/ menus | Yes* | Small |
| Zhang, Wedel and Pieters (2009) | Advertising/ menus | Yes* | Large |

| | Stimuli | Result: higher visual attention associated with higher choice likelihood | Sample size |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------|--------------------|
| Reale and Flint (2016) | Advertising/ menus | Yes [not a direct examination] | Small |
| Kim et al. (2018) | Advertising/ menus | Yes [not a direct examination] | Small |
| Krajbach, Armel and Rangel (2010) | Products | Yes* | Small |
| Reutskaja et al. (2011) | Products | Yes* | Small |
| Jantathai et al. (2013) | Products | Yes* | Small |
| Behe et al. (2015) | Products | Yes* | Large |
| Van der Laan et al. (2015) | Products | Yes** | Small |
| Danner et al. (2016) | Products | Yes** | Small |
| Russo and Leclerc (1994) | Retail shelf | Yes** | Small |
| Pieters and Warlop (1999) | Retail shelf | Yes** | Small |
| Chandon et al. (2009) | Retail shelf | Yes** | Large |
| Atalay, Bodur and Rasolofoarison (2012) | Retail shelf | Yes* | Small |
| Behe et al. (2013) | Retail shelf | Yes* | Large |
| Clement, Aastrup and Charlotte Forsberg (2015) | Retail shelf | Yes* | Small |
| Huddleston et al. (2015) | Retail shelf | No difference found | Large |
| Clement (2007) | Real store | No difference found | Small |
| Otterbring et al. (2014) | Real store | No difference found | Small |
| Hendrickson and Ailawadi (2014) | Real store | Yes (descriptive observation) | Not available |
| Gidlöf et al. (2017) | Real store | Yes** | Small |
| <p>Key:</p> <p>* the measures of visual attention were statistically significant</p> <p>** at least one measure of visual attention was not significant (partial support)</p> <p>Study conducted in a laboratory (no colour) or <u>real shopping environment</u></p> <p>Small sample – under 100 respondents; large – 100 respondents or more</p> | | | |

Table 5: Literature review summary – visual attention and choice

2.5. FAMILIARITY – TOP-DOWN FACTOR

2.5.1. OVERALL CONCEPT

2.5.1.1. FAMILIARITY

Familiarity is a broad concept featured in a wide range of research in the marketing literature. The most commonly used definition was introduced by Alba and Hutchinson in 1987, who described familiarity as “the number of product-related experiences that have been accumulated by the consumer” (p.411). The term “product related experience” includes a range of brand interactions, such as prior experience, advertising exposure, information search, decision-making and product usage (Alba and Hutchinson, 1987). As the number of interactions with a product or the number of retail venue visits increases, consumers learn product attributes and characteristics or shop layout and store more information in their long-term memory (Hutchinson and Eisenstein, 2008). Essentially, greater familiarity is associated with a better knowledge about a product or environment, as repeated interactions lead to richer, more detailed knowledge structures in consumer memory (Hoch and Deighton, 1989).

Familiarity is an important variable in marketing research as it affects consumers’ memory, attitudes and behaviour throughout the shopping journey. For example, consumers tend to more accurately recall advertisement information on familiar brands (Kent and Allen, 1994). Familiarity with a brand positively influences consumer confidence and trust in a brand (Laroche, Kim and Zhou, 1996; Holden and Vanhuele, 1999). Furthermore, prior exposure or unconscious familiarity can positively influence stimulus liking – a concept called the mere exposure effect (Zajonc, 1968; Bornstein and D’Agostino, 1992).

Consumers at various levels of familiarity employ different heuristics to make choices and are prone to decision biases (Park and Lessig, 1981). Generally, shoppers tend to choose brands they are more familiar with (Baker, Grewal and Parasuraman, 1994). Familiarity also influences how consumers acquire information at the point of sale. Familiar shoppers tend to conduct a less thorough search at the point of purchase. During a longitudinal study taking place over six weeks, respondents chose a loaf of bread every week while their external search behaviour was assessed by a behaviour process method – the number of acquisitions, brands and attributes searched was noted for each respondent (Moore and Lehmann, 1980). It was concluded that as the number of previous purchases increased, the amount of search information significantly decreased. Familiarity also influences what cues consumers use to make a

choice. Familiar consumers tend to rely on their past experiences to make a choice, and thus seem to rely more on their memory (Park and Lessig, 1981). In contrast, unfamiliar consumers use non-functional product characteristics such as brand and price as proxies to make a choice (Park and Lessig, 1981).

2.5.1.2. FAMILIARITY WITH A SHOPPING ENVIRONMENT

Research in the field of psychology has demonstrated that the behaviour of animals and people is influenced by the surrounding environment (Mehrabian and Russell, 1974). The research has predominantly focused on studying the influence of workplace environments such as hospitals, schools and prisons on people's behaviour.

Meanwhile, the researchers in the field of marketing have noted this and started to apply the developed models to retail environments (Donovan and Rossiter, 1982). The retail marketing literature defines shopping environment as all in-store stimuli split into three categories – social, design and ambient (Baker, 1986). "Social factors" refers to people present in the environment – including other shoppers and sales assistants. Design factors include all visual stimuli such as architecture, materials, colours, layout. Ambient factors comprise non-visual factors such as store temperature, lighting, music and scent (Baker, Grewal and Parasuraman, 1994). These in-store stimuli that create the store environment have the potential to influence consumer behaviour (Levy and Weitz, 2012).

The concept of familiarity with the shopping environment builds on the definition of familiarity outlined in the previous section, and in the literature generally refers to consumers visiting a store multiple times and memorising key elements of the shopping environment. Thus, greater shopping environment familiarity – or store familiarity – is associated with a better knowledge of the store layout, merchandise and products.

Prior research has examined the influence of familiarity with the shopping environment on various aspects of consumer behaviour. Familiar shoppers tend to find it easier to search for specific products (Titus and Everett, 1995), but make more unplanned purchases (Inman, Winer and Ferraro, 2009); they also find it easier to navigate around a shopping mall (Dogu and Erkip, 2000). The differences in consumer behaviour between familiar and unfamiliar consumers are likely to be reflected in different eye movement patterns. Yet despite developments in eye-tracking technology, few papers have set out to empirically evaluate the influence of store familiarity on visual attention.

2.5.1.3. *FAMILIARITY AND VISUAL ATTENTION*

Familiarity is the most studied factor influencing visual attention (Wedel and Pieters, 2006). Yet most research has focused on familiarity with advertising and brands, with areas such as familiarity with real retail environments being under-researched, as shown in the summary in Table 3.

The aim of the current study was to investigate how familiarity with a real-life retail venue influences visual attention to its environment and to the products at the point of purchase. However, the literature search identified only a few papers that looked at store familiarity and visual attention in a real environment. As a result, the scope of the literature review was broadened to include papers that examined the influence of other types of familiarity, such as familiarity with advertising, brands, settings and tasks, on visual attention.

It should be noted that not all of the reviewed papers explicitly stated that they studied familiarity. For example, in the research featuring print advertising, researchers showed ads multiple times during an experiment, so the repeating ads were likely to become more familiar to consumers. Thus, the current review included studies that directly stated that they measured familiarity, as well as the ones that stated they studied repeater exposure or just presented stimuli repeatedly and measured visual attention.

The literature review is split into two main sections according to the setting of the experiment – laboratory or real-life shopping environment. Due to the greater number of research papers, the laboratory-based studies section is further split in subsections according to the type of familiarity the study looked at. The papers are arranged chronologically within each subsection to showcase how the research has evolved over the years. The section concludes with an overall summary and rationale for the study, which are used to develop a hypothesis to be tested in the current project.

2.5.2. *FAMILIARITY: LABORATORY BASED STUDIES*

The current section examines the research carried out in simulated environments. The studies are split into three broad groups according to the familiarity variable – familiarity with advertisements; familiarity with companies, brands and product categories; and familiarity with tasks and settings.

2.5.2.1. *FAMILIARITY WITH ADVERTISING*

Research on familiarity and visual attention in advertising began in the early 1990s, with research questions relating to health and public policy. Krugman et al. (1994) set

out to assess whether health warnings in cigarette advertising influenced the visual attention of adolescents. The team compared an established health warning used at the time on print advertisements with a newly redesigned warning. As the old design version was featured on the advertising at that time, the respondents were likely to be familiar with it. The researchers recruited a large sample of respondents for the time – 326 teenage participants – and showed them different types of advertisements on a projector screen while measuring their eye movements. The findings indicated that significantly fewer participants focused on ad elements containing the old – hence more familiar – warning design. They also reported that the old warning was noted significantly later than the new one. This suggested that a certain element of an advertisement – a health warning – received less visual attention, as consumers become more familiar with it by seeing it on multiple advertisements. In contrast, when they were faced with a new – thus unfamiliar – health warning, they tended to notice it more.

Although the study provided some basic insights into the influence of familiarity on visual attention, it is hard to generalise the findings beyond the context due to the chosen stimulus. The study focused on a single ad element, a health warning, and it was assumed that consumers were familiar with it, as it was an element that had to be present in ads at the time. Perhaps because the same creative execution of a warning was present in all advertisements, consumers came to expect it. Hence, just the fact that there was something new in a place where they expected to see the standard warning could have drawn their attention, rather than their familiarity with it. The study was also based on a sample of adolescents which is a younger sample than recruited by subsequent researchers.

Pieters, Rosbergen and Hartog (1995) addressed some of the limitations of the study carried out by Krugman et al. (1994) and demonstrated that consumers familiar with an ad pay less attention to it. The researchers investigated the effects of multiple advertisement exposures and motivation on visual attention to print ads, as well as to their elements – headline, pictorial, text and packshot. Multiple exposure was used as a measure of familiarity, because with increased exposures consumers are more likely to learn and memorise the ad, thus becoming more familiar with it. Although the study focused on a smaller sample of individuals (68 respondents) than Krugman et al. (1994), it utilised a similar methodology and showed the advertisements on a projector screen, measuring the eye movements of participants. The results expanded the findings of Krugman et al. (1994) and demonstrated that consumers more familiar with an ad – those who saw it multiple times – looked less not just at certain elements, but

at the overall ad. Furthermore, familiarity influenced the participants' visual search – participants with higher ad familiarity skipped significantly more ad elements. However, it did not influence the order in which elements were looked at. The findings suggest that as consumers become more familiar with advertising they still view the ad in a similar manner, yet they tend to skip the ad elements they see as perhaps not relevant or the ones they have already learned through multiple exposures.

This inverse relationship between visual attention and familiarity was further supported by Pieters, Rosbergen and Wedel (1999). The researchers looked at how the amount and distribution (referred to as scanpaths) of visual attention to print advertising was affected by multiple exposures. The respondents were asked to view a digital magazine on a computer screen while their eye movements were recorded. It was concluded that multiple exposures to an ad – hence, increased familiarity with it – led to significantly less visual attention to it. Specifically, on average, by third exposure a print ad received just over a half of the attention it received during the first exposure. This finding directly supports the conclusions reached by Pieters, Rosbergen and Hartog (1995).

Furthermore, Pieters, Rosbergen and Wedel (1999) confirmed the findings of Pieters, Rosbergen and Hartog (1995) and showed that although the overall visual attention to an ad decreased with familiarity, it did not alter the order in which the ad elements (such as brand name, product, headline and pictorial) were viewed and the direction of eye movements as measured by scanpath. This demonstrated that the measurement of visual attention can influence the outcome. Although consumers scanned familiar ad elements in a similar order and with a similar scanpath than unfamiliar ads, overall they paid less attention to familiar ads. Pieters, Rosbergen and Wedel (1999) employed a more robust methodology than the previous research outlined in this section and recruited a random sample of 118 participants, whereas the previous researchers based their findings on non-probability samples of students or consumers recruited via a market research company. Therefore, by confirming previous results in a study with a robust methodology, Pieters, Rosbergen and Wedel (1999) provided further support that more familiar advertisements attract less attention, but also showed that familiarity does not influence the direction of visual attention.

Until that point, researchers had focused on examining visual attention to the whole ad or to the order in which its elements are viewed, rather than looking at visual attention to specific ad elements. The latter topic was studied by Pieters, Warlop and Wedel (2002) a few years later. The authors examined the effect of print advertisement

originality and familiarity on visual attention to the key ad elements – brand, text and imagery. The researchers used eye-tracking data from a previous study, which included eye gaze data from 119 participants browsing through two magazines with 58 full-page ad inserts. Higher ad familiarity was shown to reduce visual attention to the text element of the ad. However, higher familiarity did not have an effect on visual attention to brand or pictorial elements. This finding provides further insight into the way familiarity influences visual attention.

Both Pieters, Rosbergen and Hartog (1995) and Pieters, Rosbergen and Wedel (1999) showed that familiar consumers tended to scan ad elements in a similar order, thus they still saw the main elements, but they looked less at the overall ad. Pieters, Warlop and Wedel (2002) expanded on these findings and showed that the reduction in overall attention to the ad is likely to come from familiar consumers looking less at the text elements of the advertisement. This demonstrated that the content of an ad has the potential to influence consumers' visual attention. Nonetheless, it should be noted that Pieters, Warlop and Wedel (2002) used a different measure of familiarity than the previous studies outlined in this section. The prior research measured familiarity as the number of repeated exposures during the study (Pieters, Rosbergen and Hartog, 1995; Pieters, Rosbergen and Wedel, 1999) or chose a widely used health warning design that the participants were likely to have seen before in real advertising (Krugman et al., 1994). In these instances, the researchers were confident that they had a valid measure of familiarity for an individual participant. Pieters, Warlop and Wedel (2002) took a different approach, using two independent sets of four trained judges to measure each advertisement familiarity on a 7-point scale. The need for independent judging was likely caused by the authors reusing the data collected for a different project without assessing the familiarity of respondents in that study. As familiarity is a subjective concept (an ad judged familiar by a judge might not necessarily be familiar to an individual respondent), this approach reduces the validity of the measurements. As a result, the research findings of Pieters, Warlop and Wedel (2002) may not be directly comparable to those of other studies.

The topic of implicitly familiar advertisement elements and visual attention was further examined by Peterson et al. (2010). The team aimed to examine teenagers' visual attention to print advertisements and subsequent memory of the ads. The researchers examined the differences between visual attention to ads featuring the approved textual health warnings and ads featuring a novel health warning with an image. As the approved warnings were used on all advertisements in real life, the participants had probably encountered them before and were thus more familiar with them. The results

were consistent with the earlier findings of Krugman et al. (1994) and showed that a familiar, widely used design received significantly less visual attention than the new unfamiliar design. However, it should be noted that the novel design used by Peterson et al. (2010) featured a graphic image together with a textual message. The presence of an image that was out of place relative to the overall design might have influenced visual attention regardless of the message, especially given the small sample of 32 respondents.

2.5.2.2. FAMILIARITY WITH COMPANIES, BRANDS AND PRODUCT CATEGORIES

The current section outlines previous research on the influence of familiarity with brands, companies and product categories on visual attention, splitting it into two groups according to the type of stimuli used in each study – advertising or products.

Research using advertising as stimuli

One of the first researchers to study how familiarity with a business influences consumers' visual attention to its advertising was Lohse (1997). His main research goal was to investigate the eye movement patterns of consumers browsing through the Yellow Pages catalogue. Although Lohse's focus was on the influence of bottom-up features on visual attention (the effects of ad size, position, colour, etc.), he also included familiarity with the business as a variable. In Lohse's experiment, consumers looked at the pages of the Yellow Pages catalogue, which featured a range of advertisements for multiple businesses, while their eye movements were recorded. The results showed a significant difference in the ad viewing time between business categories. Less familiar business types such as banks or removal companies attracted more visual attention than more familiar ones such as pizza companies. This demonstrated that while browsing through the Yellow Page catalogue consumers paid less visual attention to more familiar businesses. However, it should be noted that the sample size used by Lohse (1997) was quite small, featuring just 32 individuals.

The small sample size limitation of Lohse (1997) was addressed in his co-authored follow up paper, Lohse and Wu (2001). The researchers aimed to generalise the findings of Lohse (1997) to a different cultural setting and thus recruited a larger sample of participants in China for comparison with the earlier research conducted in the United States (Lohse and Wu, 2001). Although the study used different business types in their research to reflect local companies, the findings were consistent – participants looked at the ads for plastics and transportation (categories identified as being less familiar) significantly longer than those for restaurants and clothing (more

familiar). Thus providing further support for Lohse's (1997) findings, demonstrating that the influence of familiarity on visual attention was consistent in another geographic location.

Subsequent research into the familiarity with a brand and visual attention was undertaken by Pieters and Wedel (2004). The researchers further expanded the understanding of relationships between brand familiarity and visual attention to ads. In one of the biggest studies on this topic, the researchers combined data from 33 separate proprietary studies that on average consisted of 110 randomly selected respondents, looking at a total of 1361 full page ads. The study focused on examining the role of ad element size (brand, image and text) on visual attention to the ad. As part of their investigation, the team also looked at how brand familiarity affects visual attention. The findings indicated that consumers looked less at advertisements for familiar brands. This showed that familiarity with a brand reduces visual attention to the ad when it is shown on its own, or when it is featured as a part of an array, as demonstrated by Lohse (1997) and Lohse and Wu (2001).

Pieters and Wedel (2004) provided further insights into the effects of familiarity on visual attention to specific ad elements – brand, pictorial and text. Higher familiarity with an advertised brand significantly reduced visual attention to the brand but significantly increased visual attention to the text element. Familiarity with a brand also reduced visual attention to pictorial element, but the difference was not statistically significant. The differences in observed visual behaviour may be because regardless of their familiarity, consumers need to make more fixations to read the text to understand its context, whereas one fixation may be enough to get the gist of an image. Although the study featured a large probability sample, similarly to Pieters, Warlop and Wedel (2002), familiarity with a brand was assessed by a team of independent judges rather than by individuals taking part in the experiment. As data were collected for other purposes, familiarity was not measured during the original experiments. Therefore, although the study had a robust methodology, the validity of such a subjective concept as familiarity with a brand is questionable.

The findings of Pieters and Wedel (2004) demonstrated the importance of assessing how different aspects of familiarity influence visual attention. Although both Pieters and Wedel (2004) and Pieters, Warlop and Wedel (2002), who studied familiarity with an advertisement, concluded that greater familiarity reduces visual attention, the studies found contrasting effects of familiarity on specific ad elements. Pieters, Warlop and Wedel (2002) noted that greater familiarity with an advertisement leads to less visual

attention to the text elements but more attention to brand and imagery, whereas Pieters and Wedel (2004) concluded that higher familiarity with an advertised brand increased visual attention to the text but reduced visual attention to the other ad elements. The differences are likely to be explained by the researchers' measuring different types of familiarity. Consumers familiar with an advertisement may already know its message and thus do not see the need to read the textual elements again. Instead, consumers familiar with a brand may already know its visual identity and hence focus on textual information to understand the key message of the advertisement.

Research using supermarket shelves as stimuli

Research on the influence of familiarity with brands and product categories on visual attention began in 1994, when Russo and Leclerc published one of the classic studies examining eye movements during product choice. Although the main goal of their research was to study the visual attention of consumers during different stages of their decision-making, the researchers also examined how product category familiarity, measured as past purchase frequency, influenced visual attention. The experiment took place in a laboratory where the team mocked-up a shelf with real products and asked the participants to pick one. During the choice task, the respondents' visual attention was recorded. However, the researchers used an older method of measuring visual attention. They recorded respondents' faces using a video camera hidden behind a one-way mirror at the back of a shelving unit and subsequently derived eye movements by coding video recordings. Overall, Russo and Leclerc (1994) found no significant differences between familiarity with a product category and the amount of visual attention it received.

However, further examination of the relationship at different stages of the decision-making process demonstrated that during the evaluation stage, the visual attention of customers with greater familiarity was more focused. The total time, number of fixations, number of different brands and sizes fixated – the measures of visual attention used by the researchers – were lower for more familiar customers, and the difference was statistically significant. More familiar customers also demonstrated a higher proportion of fixations on the chosen alternative and on single eliminations, but this difference was not statistically significant. These results showed that the way familiarity influences visual attention can differ during the choice process. The findings also highlighted that the results of studies examining visual attention may depend on the specific measures used to assess visual attention. Prior researchers reached a similar conclusion when investigating familiarity with advertising and visual attention.

Russo and Leclerc's (1994) study was an important and pioneering investigation of consumers' visual attention during choice tasks. The researchers used real shelves with real products arranged in a laboratory to increase the internal validity of the study, and chose multiple product categories – applesauce, ketchup and peanut butter – to examine the effects across product groups. Consumers' purchase frequency was used to assess familiarity with a product category – a valid measure of familiarity based on consumers' prior experience of the product category. However, it should be noted that the researchers used an older and less reliable method of measuring visual attention and the results were based on a relatively small sample, 47 female participants, limiting their wider generalisability.

After Russo and Leclerc's (1994) investigation of the influence of product familiarity on visual attention, research on this topic stalled for more than a decade. It resumed in 2009, when Chandon et al. included past brand purchase – or familiarity with a brand – as one of the out-of-store factors influencing visual attention. Overall, Chandon et al. (2009) aimed to assess how a range of in-store and out-of-store factors affect visual attention and subsequent evaluation. The results of their study demonstrated that customers who are more familiar with a brand – who buy it occasionally or regularly – are significantly more likely to notice and re-examine it (the measures of visual attention used in the study). Although, the absolute difference was not large, non-users (completely unfamiliar consumers) had a 71% probability of noting a brand, versus 76% for regular users.

These findings contradict the results of previous research conducted by Lohse (1997) and Lohse and Wu (2001), who showed that when faced with a range of business advertisements, familiar businesses are looked at less than unfamiliar ones. When faced with a choice between products, consumers may opt for a brand with which they are familiar. Chandon et al. (2009) noted that the average probability of choosing an unfamiliar product in their study was 1%, compared with 49% for a familiar one. This highlighted that during a choice task consumers may aim to find a familiar product, thereby increasing visual attention to it. The researchers also used a binary measure of visual attention to products – “ever looked at” or fixated at least twice. Therefore, it is possible that overall, familiar products received less attention than less familiar ones, but this could be due to the metric used in the study.

Overall, the results of the study were quite robust; they were based on a large sample of 384 shoppers recruited across eight cities in the United States, who were randomly allocated to experimental groups. However, the researchers used images of

supermarket shelf displays projected on a wall as stimuli in the research, thus limiting the generalisability of the results to the real environment. It should be noted that Chandon et al.'s (2009) findings cannot be directly compared to those of Russo and Leclerc (1994), as the latter team of researchers studied the influence of familiarity with a product category as a whole, not of familiarity with a brand, on visual attention. This made the premise of their study different. Chandon et al.'s (2009) research also further demonstrated the need to test multiple instances of familiarity rather than relying on generalisations due to the intuitive similarity of concepts.

2.5.2.3. FAMILIARITY WITH TASKS AND SETTINGS

A few researchers have examined how familiarity with a task and research setting influences visual attention. Goldberg, Probart and Zak (1999) investigated how consumers look at product labels. More specifically, the team compared practised readers, defined as consumers who read more than four labels during their shopping and who are likely to be familiar with the task, with non-readers, or consumers who rarely pay attention to labels and are therefore unfamiliar with their layout. The researchers looked at how easily each group found the information on food nutrition labels. The participants who were more familiar with label reading found relevant nutritional information significantly more quickly and with fewer fixations than those who were unfamiliar with the task. Although the study used a small sample of just five individuals in each group, it obtained 180 observations from each respondent, yielding a much bigger sample of observations. The findings provided some preliminary evidence that being more familiar with the task at hand and perhaps knowing where information is located results in consumers' paying less attention to product labels.

Drèze and Hussherr (2003) examined a different aspect of familiarity: how familiarity with the Internet influenced their respondents' visual attention. The main aim of their research was to examine why banner ads used on Web pages seemed to be ineffective and determine ways to make them more effective. The team also measured the respondents' familiarity with the usage of the Internet and its influence on visual attention. During an experiment, the respondents were asked to use a search website to find specific information, while their eye movements were recorded. Their familiarity was measured in a follow-up questionnaire, and based on the answers, the respondents were split into novice (unfamiliar with the medium) and expert (familiar with the medium) groups. The results showed that the expert consumers, who were more familiar with the Internet, tended to make significantly fewer fixations, looked at fewer studied areas and overall spent less time looking at the pages. However, as in

Goldberg, Probart and Zak's (1999) study, the results were based on a small sample of 49 individuals, making it hard to generalise them to other settings. Nevertheless, the results provided preliminary insights that the visual attention of people who are more familiar with the setting in which they perform a search task is more efficient.

2.5.2.4. SUMMARY OF FINDINGS

In summary, the results examined in this section demonstrated that consumers' greater familiarity with an advertisement reduces their visual attention to it. Krugman et al. (1994) and Peterson et al. (2010) showed that when a familiar element was present in an advertisement, such as a health warning design, it received less visual attention than an unfamiliar design of the same element. Subsequently, Pieters, Rosbergen and Hartog (1995) and Pieters, Rosbergen and Wedel (1999) demonstrated that greater overall familiarity with an ad made respondents less visually inquisitive, reducing their visual attention to the whole ad. The research also highlighted that the measure of visual attention used may influence the research results. Both Pieters, Rosbergen and Hartog (1995) and Pieters, Rosbergen and Wedel (1999) demonstrated that although familiar advertisements received less attention overall, respondents still viewed their main elements (brand, images, text) in a similar order. Subsequent research by Pieters, Warlop and Wedel (2002) showed that greater familiarity with an ad influenced visual attention to its elements – familiarity reduced visual attention to the text but not to the brand or images.

Studies have also examined the influence of familiarity with a business, brand and product category on visual attention to ads and products. The results again showed that greater familiarity reduced visual attention to the studied stimuli. Lohse (1997) and Lohse and Wu (2001) found that when faced with a complex layout featuring multiple business advertisements, consumers paid less attention to the ads for the businesses they knew. In contrast, Pieters and Wedel (2004) showed that being familiar with a brand reduced visual attention to an overall print advertisement for this brand. However, the influence of familiarity with a brand on visual attention to the ad elements (brand, text and pictorial) differed from that of familiarity with an advertisement. Consumers familiar with a brand looked more at the text and less at the brand and pictorial elements. Studies examining the influence of product category and brand familiarity on visual attention to products on a supermarket shelf provided mixed results. Russo and Leclerc (1994) found no relationship between familiarity with a product category and visual attention throughout the overall decision-making process, but reported that during the evaluation stage, consumers looked less at familiar product

categories. In contrast, a more recent study conducted by Chandon et al. (2009) showed that greater familiarity with a brand made consumers look at it more. This contradicted the findings of the research reviewed so far and demonstrated the need to assess multiple elements of familiarity in a marketing setting.

Lastly, although the link between familiarity with a task and setting and visual attention has not been researched in depth, the results of studies examining this relationship were consistent with previous findings regarding other types of familiarity. Goldberg, Probart and Zak (1999) and Drèze and Hussherr (2003) showed that consumers who were familiar with a setting or a task were more efficient in their visual search. People who were familiar with a task found the required information more quickly and more efficiently, whether they were reading a label or finding information on a website.

2.5.3. FAMILIARITY: REAL-LIFE SHOPPING ENVIRONMENT BASED STUDIES

The research examined so far looked at how various aspects of familiarity influenced visual attention studied in a laboratory environment. The current section examines how familiarity with brands, product categories and real-life shopping environments influences the visual attention of consumers in a real retail environment. To avoid repetition, this section is not split into subsections, as the same papers investigated these concepts.

In 2013, Clement, Kristensen and Grønhaug set out to investigate how the physical characteristics of packaging affect visual attention to products in a real supermarket. The study also examined how the familiarity of the respondents with the product category, purchased brand and studied store influenced their visual attention. The researchers found no correlation between familiarity with a product category and visual search patterns, or between familiarity with a chosen brand and visual attention to it. However, consumers more familiar with the grocery store in which data were collected spent significantly less time searching for their desired product. The measurements of visual attention obtained by Clement, Kristensen and Grønhaug (2013) are likely to be more valid, given the methodological choices made by the team. The only direct instruction the participants were given was to avoid shopping on the day of the experiment and the day before to make sure that they were undertaking a genuine shopping trip. During the experiment, consumers were asked to shop as they intended and to pay for the products they wanted to purchase, although they did not receive any reward for taking part in the study. This approach was likely to ensure accurate data, as the consumers had a genuine need to visit the store, their choices were not directed

and they were not influenced by monetary rewards. However, as no instructions were given to the respondents, during the analysis the original sample size fell from 61 respondents to 47, as the researchers excluded consumers who had not purchased a brand from a jam product category.

A subsequent study that examined how familiarity with a brand and store influenced visual attention was undertaken by Otterbring et al. (2014). The researchers carried out two experiments to examine how in-store advertising priming influences shoppers' visual attention, as well as how consumers use signs in a supermarket during navigation and decision-making. The respondents were indirectly primed by having their attention drawn to a product advertisement indicating in which aisle the experiment would take place. By making respondents look at the advertisement, it was likely that the advertised product became more familiar to the consumers. The researchers then studied visual attention to the primed product. It was concluded that the primed product – the one consumers had already been exposed to and hence were more familiar with – was noted significantly faster and with a higher average number of visits than a control product. This finding contradicts the earlier conclusions reached by Clement, Kristensen and Grønhaug (2013), who noted that familiarity with a brand did not influence visual attention to it. However, the study confirmed and generalised the results obtained by Chandon et al. (2009) in a laboratory environment. Chandon et al. (2009) concluded that when choosing a product from an image of a supermarket shelf, consumers notice and re-examine familiar brands more than other brands. However, it should be noted that Otterbring et al. (2014) based their findings on a relatively small sample of 74 consumers and did not explicitly measure familiarity. Instead, familiarity was inferred from the priming procedure used by the team during the participants' briefing.

In a second experiment, Otterbring et al. (2014) examined the extent to which consumers used in-store signs while navigating around the store and to what extent familiarity with a store influenced their visual attention. The results indicated that overall store familiarity did not affect visual attention to the in-store signs. However, during a navigation stage, store familiar consumers made significantly fewer fixations on signs than store unfamiliar customers. These results are consistent with the overall findings reached by Russo and Leclerc (1994), who studied visual attention in an artificial environment. Although Russo and Leclerc (1994) examined how familiarity with a product category influenced visual attention to products – thus only studying one stage of the customer journey, such as standing in an aisle and making a choice – the team concluded that the effect of familiarity differs across the stages of consumer decision-

making. Thus Otterbring et al. (2014) generalised Russo and Leclerc's (1994) findings to a real-life shopping environment.

Otterbring et al. (2014) recruited a large sample of 101 individuals and asked them to pick up six tasks from a shopping list provided to them, while their eye movements were recorded. This approach aimed to ensure that a similar route was taken by the respondents and that their visual attention patterns could be compared. However, the study measured only one aspect of in-store visual attention – visual attention to signs. Consumers' familiarity with a store may have a different influence on visual attention to other areas, but it was not measured.

Another project that studied familiarity and visual attention was undertaken by Gidlöf et al. (2017). Their aim was to examine the effects of top-down and bottom-up factors on visual attention in a real supermarket. However, the researchers also examined how consumers' familiarity with a product category and with the store influenced their visual attention. The team showed that participants more familiar with a product category tended to look significantly less at any specific product. This finding directly contradicted the conclusions reached by Clement, Kristensen and Grønhaug (2013), who noted that familiarity with product category was not correlated with visual attention. This difference in the findings may have been caused by the more sophisticated regression analysis used by Gidlöf et al. (2017), which could have uncovered the differences not found by Clement, Kristensen and Grønhaug (2013). However, it should be noted that Clement, Kristensen and Grønhaug (2013) employed a more realistic procedure of data collection – the respondents were not instructed to choose a specific product and were not paid. In contrast, Gidlöf et al. (2017) asked shoppers to undertake their planned shopping but also to purchase a product from the pasta, cereal and yoghurt product categories; the participants were paid enough to cover the expense of the additional items. Therefore, some of the participants in Gidlöf et al.'s (2017) study could have behaved differently when choosing a product that they perhaps did not need at the moment and for which they did not need to pay with their own money.

Gidlöf et al. (2017) also examined the influence of store familiarity on visual attention. The researchers took an innovative approach: instead of measuring familiarity, as in the earlier research featured in this section, they manipulated it. The team recruited 50 participants in a supermarket and asked them to wear eye-tracking equipment while performing their grocery shopping. The respondents were asked to return a month later to a different supermarket, where they undertook a similar task. This experimental set

up aimed to ensure that on a second trial, shoppers made their purchases in a different and thus probably less familiar supermarket. However, the researchers showed that the consumers exhibited similar visual search patterns between the stores, indicating that familiarity did not influence visual attention. This directly contradicted the earlier findings of Clement, Kristensen and Grønhaug (2013).

The difference was probably caused by different ways of measuring familiarity with a store. While Clement, Kristensen and Grønhaug (2013) used past store visits to infer familiarity, Gidlöf et al. (2017) manipulated familiarity by asking the respondents to visit a different supermarket. This approach did not directly measure consumers' experiences of a second store, and as the two stores were based in the same city, the respondents may have visited both. Furthermore, Gidlöf et al. (2017) noted that supermarket layouts in general appear to be quite similar. Thus, respondents who were familiar with the first supermarket are likely to have reused some of that knowledge in the second supermarket despite not being familiar with that specific venue. The research was also conducted in the same supermarket chain, which further increased the chances of the store interiors' looking quite similar. Therefore, although the team aimed to control and manipulate shoppers' familiarity with a supermarket, their findings suggest that the in-store environment needs to be different for consumers to engage in visual exploration.

2.5.3.1. SUMMARY OF FINDINGS

This section demonstrated that research into different aspects of familiarity and its influence on visual attention in a real environment is scarce and the findings are mixed. The differences in research findings are likely to be due to the use of slightly different methodological approaches, making it hard to generalise and directly compare the results. Clement, Kristensen and Grønhaug (2013) showed that familiarity with a product had no influence on visual attention to the product, whereas Otterbring et al. (2014) concluded that familiar brands are noticed earlier and receive more visual attention. With regard to familiarity with a product category, Clement, Kristensen and Grønhaug (2013) also concluded that greater familiarity does not influence visual attention, whereas the subsequent research conducted by Gidlöf et al. (2017) indicated that greater familiarity with a product category reduces visual attention to the relevant products.

A few researchers have also examined the influence of store familiarity on visual attention. Clement, Kristensen and Grønhaug (2013) found that being familiar with a store reduced visual attention to the products, but Gidlöf et al. (2017) did not find a

relationship between these variables. Furthermore, Otterbring et al. (2014) examined how familiarity with a store influences visual attention to in-store signs. The team concluded that throughout the whole customer journey, familiarity with a store has no effect on visual attention to the in-store signs. However, during the navigation stage of their shopping journey, familiarity with a store reduced visual attention to the in-store signs.

2.5.4. GAP IN THE LITERATURE AND HYPOTHESIS

The first research question asked in the current project was whether familiarity with a pub environment influences visual attention to that environment and to the specific brands at the point of purchase. From the theoretical standpoint, more store visits or greater store familiarity leads to memorisation of the in-store environment and the location of its merchandise. This enables store familiar consumers to carry out their shopping tasks with less cognitive effort, often relying on heuristics, as they are likely to utilise their internal memory to navigate and find the products they need (Park, Iyer and Smith, 1989). Thus, consumers who better remember the environment are likely to be more efficient and hence require less time and effort to find a product.

Recently, Huddleston et al. (2018) highlighted that more research is needed to investigate how the store environment influences consumers, and theorised that greater familiarity is likely to influence consumers' visual attention. The current literature review demonstrated that studies directly examining the influence of store familiarity on visual attention to its environment and products are scarce and their results are mixed. The research conducted so far focused only on one retail setting – a supermarket – and employed different methodologies, making it hard to compare the findings or generalise the results to other settings. In addition, researchers have not yet examined how familiarity with a store influences visual attention to its environment, with the exception of in-store signs (Otterbring et al., 2014). The current research aimed to fill this gap by determining how familiarity with a novel retail environment influences consumers' visual attention to its environment and how it affects visual attention to products at the point of purchase.

The limited amount of research and mixed findings of studies carried out in a real environment made it hard to generate a research hypothesis. Some papers have found that greater familiarity is linked with lower visual attention, whereas others have found either no relationship between the variables, or the opposite results. Consumers who are more familiar with a pub may look less at the products on offer, based on the results by Clement, Kristensen and Grønhaug (2013), who employed a robust

methodology to assess familiarity. However, being familiar with a shopping environment may also negatively influence general visual attention to the in-store environment, at least during some of its stages, according to Otterbring et al. (2014).

The development of the hypothesis was further influenced by the results of studies conducted in a laboratory environment. Pieters, Rosbergen and Hartog (1995) and Pieters, Rosbergen and Wedel (1999) showed that familiarity with an advertisement reduces visual attention to the ad, but that the order in which the ad elements are viewed remains similar. In contrast, Pieters, Warlop and Wedel (2002) demonstrated that consumers with greater familiarity with an advertisement start filtering out certain ad elements. Similarly, Lohse (1997), Lohse and Wu (2001) and Pieters and Wedel (2004) demonstrated that advertisements for more familiar brands generate less visual attention. Lastly, Goldberg, Probart and Zak (1999) and Drèze and Hussherr (2003) showed that being familiar with a task or the setting in which a search is performed reduces the visual attention of consumers.

Together, these studies indicated that increased familiarity is likely to reduce visual attention to the stimuli. In a real environment, therefore, the visual attention of consumers familiar with the environment is likely to be reduced as they start to filter out information and thus pay less attention to their surroundings. Additionally, the findings indicated that consumers who are familiar with their environment are likely to be more efficient in their visual search and thus choose a product faster and with less effort than consumers who are unfamiliar with their environment. Based on these observations, it can be hypothesised that:

H1a: Greater familiarity with the pub venue reduces visual attention to the in-store environment

H1b: Greater familiarity with the pub venue reduces visual attention to beer brands at the point of purchase

2.6. GOALS – TOP-DOWN FACTOR

2.6.1. OVERALL CONCEPT

2.6.1.1. GOALS

Consumer goals drive and direct consumer behaviour, and as such are of particular interest to marketers (Bagozzi and Dholakia, 1999). The literature has defined goals as “internal representations of desirable states that people try to attain and undesirable states that they try to avoid” (Baumgartner and Pieters, 2008, p.368). Two major

attributes characterise goals – content and intensity (Latham and Locke, 1991). Content, in turn, encompasses two other features – specificity and difficulty (Latham and Locke, 1991). “Specificity” refers to how specific or ambiguous a goal is. For example, in a consumer choice situation, a consumer has an ambiguous goal when they know they need to purchase a brand from a certain product category, as they may not yet know which exact brand they are looking for (Russell et al., 1999). Meanwhile, “goal difficulty” refers to how simple or complex a goal is (Wood, Mento and Locke, 1987). The second major goal characteristic, intensity, consists of multiple factors such as scope of goal, clarity of goal and the mental effort involved in goal processing (Latham and Locke, 1991).

The current project focused on goal specificity. The relationship between goal specificity and task performance has been widely researched. In 1991, Latham and Locke estimated that around 400 studies examining this relationship had been published. Multiple meta-analyses have indicated that having a specific goal improves performance, with effect sizes ranging from .42 to .80 (Locke and Latham, 2002). A more vague, ambiguous goal is likely to be more complicated, and the complexity of a goal influences how much information processing is required, in turn influencing consumer behaviour (Ross, 1979). Conversely, setting a specific goal tends to improve performance in a wide range of domains (Locke and Latham, 2002). Prior research has demonstrated that loggers cut more trees when faced with a set target (Latham and Locke, 1975), typists typed more text (Latham and Yukl, 1976) and students performed more tasks when spelling out their implementation intentions and hence making their goals more specific (Gollwitzer and Brandstätter, 1997).

In the field of marketing, similar differences in behaviour have been observed. Shoppers with an ambiguous goal tend to seek variety (Kushwaha and Shankar, 2013), make more unplanned purchases (Massara, Liu and Melara, 2010) and consider a larger proportion of alternatives when choosing a product (Ratneshwar, Pechmann and Shocker, 1996).

2.6.1.2. GOALS AND VISUAL ATTENTION

While familiarity and visual attention, as discussed in the previous section, have not been widely researched, the influence of goals on visual attention has been examined for more than half a century. The notion that goals influence visual attention was proposed in 1965 by Yarbush in his early pioneering work, comprised of multiple experiments. In one experiment, Yarbush asked the participants to view Repin's picture “An Unexpected Visitor” multiple times with different goals, while recording their eye

movements. The results demonstrated that a subject's scanpath – the distribution of their fixations – changed depending on the examination goal they were given, and varied dramatically between tasks (Yarbus, 1965). The goal of estimating the material circumstances of the family generated more dispersed visual attention – the subject looked around the painting and noticed people and the room – whereas the goal of estimating the ages of the people in the painting led to a more specific visual attention pattern – the respondents looked predominantly at people. While this study provided a range of insights, its major drawback was its sample size – the results were based on a single respondent, due to equipment constraints at the time. Nonetheless, Yarbus' (1965) pioneering work provided an early indication that goals are likely to influence where viewers look in scenes. Subsequent research has been carried out to examine this relationship, with some replication studies examined later in this section.

The aim of the current research was to examine how consumers' visual attention is influenced by a specific goal ("I want to purchase brand X") compared with an ambiguous goal ("I want to purchase beer") in a real-life shopping environment. As summarized in Table 4, a literature review demonstrated that only a few studies have investigated the influence of goals on visual attention in a real environment. Therefore, the scope was expanded to include studies carried out in a laboratory environment using marketing stimuli – advertisements and brands. Although the focus of the current study was on goal specificity, the literature examining this goal type remains scarce. Therefore, the scope of the current review was expanded to include studies that compared the relationships between any goals and visual attention. As the aim of the current study was to compare the groups, the literature review excluded studies that featured only one goal and included papers that compared the visual attention of consumers with different tasks and goals.

The literature reviewed in the current section is split into two sections according to the research setting – laboratory or real-life environment. The laboratory section is further split into subsections based on the studied stimuli – advertising or products. The studies within each subsection are reviewed and presented in chronological order. The section concludes with a justification and proposed hypothesis to be tested in the current project.

2.6.2. GOALS: LABORATORY BASED STUDIES

This section reviews studies examining the influence of goals on visual attention to marketing stimuli conducted in a laboratory environment. It starts by outlining studies that used print advertisements as stimuli, followed by those that used products.

2.6.2.1. ADVERTISING

Yarbus noted the influence of goals on visual attention in 1965, but this topic was not looked at in the marketing literature until the 21st century. It was first examined by Rayner et al. (2001), who studied the difference in visual attention to text and pictorial elements of print ads. However, their research design required respondents to be assigned different goals – half of the respondents were asked to imagine that they needed to buy skin lotion and body wash, and thus focused on skin-care ads, while the other half were told to imagine that they needed to purchase a car, and were thus directed to car ads. The results showed that consumers spent significantly more time and made more fixations on the ads in the category they were tasked with. However, goal did not influence visual attention to a specific advertisement element (text or imagery). This finding showed that having different goals – such as choosing a skin care product or purchasing a car – led consumers to direct more attention to the advertised product but did not influence visual attention to specific ad elements. These results were based on a small sample of 24 respondents. Although the respondents were randomly allocated to two conditions to minimise bias, this resulted in only twelve participants per group. Small sample sizes increase the likelihood of false positive results. Furthermore, the respondents were tasked to learn as much as they could about the assigned category, which may have reduced the validity of the task. The respondents could have felt that they needed to pay attention only to a selected group of stimuli in order to complete the task.

The influence of goals on visual attention was further examined by Radach et al. (2003). The researchers investigated how the congruence between the text and pictorial elements of a print advertisement affects visual attention. The team conducted two experiments. In the second, they investigated how the respondents' goal affected their visual attention. The researchers split the participants into two groups. Half of the respondents were tasked with evaluating ads, while the second group was tasked with describing what was advertised. The results showed that the viewing goal significantly affected visual attention. This supported the findings of Rayner et al. (2001). The paraphrasing group spent significantly less time and made significantly fewer fixations on the ads, compared with the evaluation group.

Radach et al. (2003) also looked at visual attention to specific advertisement elements (picture, headline and brand name). It was noted that after accounting for the size of the elements, consumers in the evaluation group looked more at the image part of the ad, whereas respondents in the paraphrasing group looked a bit more at the headline

and brand name. However, no statistical tests were conducted to examine whether this difference could have arisen from chance alone. Rayner et al. (2001) also failed to find any influence of goal on specific ad elements (text and imagery in their case).

Nonetheless, this observation showed that goal has the potential to influence not just overall visual attention to the stimulus, but also visual attention to specific areas of the stimulus. Although Radach et al. (2003) used a larger sample (32) and collected more observations from the respondents than Rayner et al. (2001), the findings were still based on a relatively small sample, limiting their generalisability.

The studies above investigated consumer goals as an additional variable while predominantly focusing on other research topics. Pieters and Wedel (2007) carried out a pioneering work in the field of marketing that set out to build on the work of Yarbus (1965) by examining how different consumer goals (ad memorisation, ad appreciation, brand learning and brand evaluation) influence visual attention to advertising elements (brand, pictorial, headline and body text). The results showed that having a goal had a significant influence on the duration of visual attention to the average ad element. However, having a goal did not influence noting of the elements, a metric that was dropped from further analysis. Compared with a baseline of free viewing, participants given memorisation, learning and evaluation goals spent significantly more time looking at the ad elements, but those in an appreciation goal condition looked at the ad element less. This showed that in some instances, goals have a positive influence on visual attention, while in others their influence is negative. Pieters and Wedel (2007) only reported visual attention to the four elements of the advertisement they studied. However, as brand, image, headline and body text represent the most important components of most print advertisements, the results could be compared with those of prior research that looked at visual attention to the whole ad. Therefore, the finding that visual attention is influenced by a goal was consistent with the earlier findings of Rayner et al. (2001) and Radach et al. (2003). Pieters and Wedel (2007) also replicated and generalised the results outlined by Yarbus (1965), demonstrating that early research carried out using paintings as stimuli can be applied in a marketing context.

Pieters and Wedel (2007) also showed that goals influence which ad elements consumers see. This suggested that some ad elements are more relevant in enabling consumers to achieve their goals. For example, memorising an ad goal caused consumers to pay significantly more attention to body copy, images and brand elements. An ad appreciation goal slightly increased visual attention to the brand but significantly reduced attention to image and headline. In contrast, a brand leaning goal

and brand evaluation goal significantly enhanced visual attention to the body copy but negatively affected attention to imagery. These findings contradicted the earlier conclusions reached by Rayner et al. (2001) who noted that goals do not influence visual attention to advertisement elements, and demonstrated that different goal types influence not just overall visual attention, but also the distribution of visual attention to specific elements. The larger sample employed by Pieters and Wedel (2007) may have enabled the researchers to find differences between the groups, which prior studies with smaller samples were not able to do. The results obtained by Pieters and Wedel (2007) are likely to be robust, as the researchers relied on a large sample of 220 participants randomly assigned to groups, each viewing 17 advertisements, thus yielding a large number of observations. However, as the researchers used advertisements appearing in a supermarket magazine, the stimuli were advertisements for food brands. This may have limited the generalisability of the findings to other product categories.

The data collected by Pieters and Wedel (2007) were subsequently reused by Wedel, Pieters and Liechty (2008) to examine how goals affect visual attention patterns. The measure aimed to identify two states of attention – local (visual identification) and global (spatial orientation). Local state is characterised by dense fixations and short saccades, while global state involves fewer and more spatially dispersed fixations, followed by longer saccades. The researchers concluded that goals significantly affect the frequency with which states change. This provided more evidence that having a goal influences visual attention. This results also demonstrated that using a different measure of attention and including data for a whole ad rather than just its key elements did not influence the results reached by Pieters and Wedel (2007), therefore adding more validity and reliability to their findings.

Subsequently, Rayner, Miller and Rotello (2008) specifically investigated how goals influence visual attention to print advertisements. The team applied a similar methodology to the papers reviewed earlier in this section, splitting the respondents into two groups. After viewing print ads, the first group was asked to rate ad effectiveness, while the respondents in the second group were asked to state how much they liked each advertisement. Contrary to the prior findings outlined in this section, Rayner, Miller and Rotello (2008) did not find differences in visual attention between the two studied groups. The researchers noted that this finding could have arisen because the goal types they chose (evaluate effectiveness and likeability) were not distinct enough to yield different visual attention patterns. This demonstrated that to measure the effect of goals on visual attention, the goals must be substantially

different, such as a goal of buying different products (Rayner et al., 2001), evaluating or describing the ad (Radach et al., 2003), memorising and appreciating the ad or learning and evaluating the brand (Pieters and Wedel, 2007).

Nonetheless, the study concluded that goals influence visual attention to specific ad elements. The participants asked to note how much they liked the ad looked significantly earlier at the image. They also looked more at the image, but this difference was not statistically significant. These findings were consistent with the earlier results of Radach et al. (2003) and Pieters and Wedel (2007), who noted that goals influenced visual attention to specific ad elements, thus providing further support for the results. Together with previous results, this finding suggested that having a goal may influence visual attention to a specific ad element, even if it does not influence overall visual attention to the stimuli. However, it should be noted that the study was based on just 24 respondents, each viewing 48 ads on a computer monitor while their eye movements were recorded. The smaller sample size and findings inconsistent with those of Rayner et al. (2001) – a study that utilised a similar methodology and stimuli – raise concerns about the validity of the findings.

2.6.2.2. PRODUCTS

The majority of research on the influence of goals on visual attention to brands has examined how specific brand search goals influence visual attention. As these studies did not compare consumer goals, they were excluded from the current literature review. An exception is the study conducted by Chandon et al. (2009). The main goal of the team was to investigate how in-store marketing influences visual attention and subsequent evaluation of products. However, in the experiment the team also manipulated the shopping goal of the participants by asking them either to choose a single brand or to name the brands they considered choosing. However, rather than splitting these respondents into two distinct groups, the researchers asked both questions, randomising their order. Thus, if a participant was randomly allocated to the choice goal condition, after the trial they were also asked to state which brands they would have considered purchasing, and vice versa. The results showed that consumers with the consideration goal spent significantly more time looking at the items than those in the choice goal condition, showing that goal had an influence on visual attention to products. The consumers with the consideration goal also looked at more brands, but this difference was not statistically significant. It is likely that when asked to state multiple items, the consumers engaged in a deeper exploration of the products on offer.

The results of Chandon et al. (2009) were based on a large sample of 384 shoppers from multiple cities in the United States. A large, geographically dispersed sample is likely to result in valid measurements and results. The team also used two different product categories, soaps and pain relievers, to increase the generalisability of the study.

2.6.2.3. SUMMARY OF FINDINGS

Taken together, studies in this area have consistently demonstrated that goals have an influence on visual attention. Rayner et al. (2001), Radach et al. (2003), Pieters and Wedel (2007) and Wedel, Pieters and Liechty (2008) all demonstrated that consumers with different goals exhibit different visual attention patterns. Rayner, Miller and Rotello (2008) was the only study that did not find the same result, but it further contributed to the discussion by demonstrating that the goals need to be quite different to result in a different visual attention patterns. Furthermore, goals tend to increase visual attention to elements of the stimuli that are informative and can contribute to goal achievement. Radach et al. (2003), Pieters and Wedel (2007) and Rayner, Miller and Rotello (2008) all demonstrated that different goals exert different effects on visual attention to the elements of an advertisement. It should be noted that all of the papers reviewed in the current section assigned goals to consumers rather than measuring their real intentions. People may behave differently when assigned goals rather than setting goals themselves. Understandably, however, in a laboratory condition it is not feasible to study the real goals of consumers.

Research into the influence of goals on visual attention to products on a shelf in a simulated environment is very limited. However, Chandon et al. (2009) demonstrated that goals have an influence on visual attention. The team showed that consumers who were asked to choose a single product spent less time looking at the products than respondents who were asked to name multiple products they considered. Although research in this area is limited, the large sample size and robust methodology used by Chandon et al. (2009) were likely to provide accurate results.

2.6.3. GOALS: REAL-LIFE SHOPPING ENVIRONMENT BASED STUDIES

The investigation of how goals influence visual attention of consumers in a real environment began with a pioneering study conducted by Clement (2007). The project examined how visual attention influenced consumer decision-making in a real supermarket. The study did not strictly examine consumer goals. Instead, the

respondents were asked to carry out their planned shopping and afterwards they were asked to indicate whether they had used a shopping list. The respondents with lists were likely to have a different goal – a more specific one – than those without lists. The author reported that consumers with a shopping goal noted less products, but that this difference was not statistically significant.

Clement (2007) aimed to make the study as realistic as possible to increase the validity of the results. The respondents were recruited in advance and were told to avoid doing any grocery shopping on the day of the experiment and a day prior to that to ensure that they had a genuine need to go to a store. They were asked to perform their planned shopping trip and to pay for their products themselves without any reward for taking part in the study. This methodology ensured that consumers had a real need to go to the store and undertake a genuine shopping journey to purchase products they needed. However, the respondents were asked if they needed to purchase pasta or jam, and if so, they were asked to purchase product from these categories as well. Although this was an important step to make sure that the data could be compared between the respondents, by specifying which products to purchase, and thus priming the respondents, the researcher may have influenced their normal behaviour. At the same time, the participants were not rewarded for taking part in the study, so they had to make real choices and pay for the products themselves, minimising the chances of their choosing products that they would not otherwise have purchased.

Furthermore, Clement (2007) did not specify at which point the consumers were made aware that they needed to make an extra purchase. If the consumers were asked to make an extra purchase at the start of the experiment in the supermarket, some of the consumers with shopping lists would not have had those products on their list. This would make a comparison between shoppers with and without lists not valid. It is of course a matter of conjecture whether the absence of a list makes a shopping goal less specific, but nevertheless that was the researcher's contention. It is also possible that differences between shoppers existed in other product categories that were not studied in this project. Additionally, Clement's (2007) research was made possible by a technological development – wireless head-mounted eye-trackers that could be used in a real environment. However, at the time, the data quality was not robust. Most of the participants – 45 out of 61 – were excluded from the study due to corrupted or unreliable data, resulting in a small sample. This increased the probability of failing to detect a difference between groups.

A subsequent investigation featuring the influence of goals on visual attention was undertaken by Harwood and Jones (2014). The researchers aimed to examine shoppers' visual attention to home, fashion and garden sections of a department store, focusing on their browsing patterns and impulse purchases. The researchers concluded that consumer goals appeared to affect the direction of their visual attention. The recruited participants reported having had a range of goals on shop entry – to buy a specific product, to examine the products, to browse the store or to go to a café. Harwood and Jones (2014) noted that the consumers tended to direct their attention to the elements of the scene that were relevant to their goal. However, the study was descriptive in nature and therefore the difference between the groups was not tested.

Harwood and Jones's (2014) findings were in line with those of Clement (2007) who noted that consumers with different goals exhibit different visual attention patterns, although the differences in his study were not statistically significant. Harwood and Jones (2014) provided further evidence that the visual attention of consumers with different goals also differs in department store sections, not just in a supermarket, thus generalising Clement's (2007) observations to a different setting. Although Clement's (2007) conclusions were not statistically significant and Harwood and Jones's (2014) results were descriptive in nature, both studies provided an indication that goals influence the visual attention of consumers. Furthermore, it should be noted that Harwood and Jones' (2014) study was based on a small sample of 16 respondents and was published as a part of an edited book and not in a peer-reviewed journal like the rest of the reviewed articles. Thus, the results have not been scrutinised by peers to the same standard as the other research examined in this section.

Whereas prior research examined consumer goals as an additional variable, Wästlund et al. (2015) conducted an in-depth examination of how goals influence consumer behaviour in real shopping environments – in a gas station, a sports store and a supermarket. More specifically, the team aimed to examine what heuristics consumers apply during the choice processes and how the complexity of a first goal influences visual behaviour during a second goal. To address the research question, the team conducted three large experiments in a range of retail settings with different shopping tasks. Due to the high relevance of the findings to the current research, each experiment is examined in detail here.

The aim of the first experiment carried out by Wästlund et al. (2015) was to examine how shopping goal influences the visual attention of shoppers to products in a gas station. The team split the respondents into three groups according to their

questionnaire answers – those who had purchased gas only (102 respondents), those who had purchased gas and an intended product (63 respondents) and those who had purchased gas plus at least one unintended product (25 respondents). The researchers measured the visual attention of the respondents as the number of visits the respondents made to each area of interest (AOI), which in most cases contained products from the same product category. The results showed that consumers in different groups exhibited significantly different visual attention patterns. This result was consistent with the observations made by Clement (2007) and Harwood and Jones (2014). Although Clement (2007) did not find significant differences and Harwood and Jones (2014) only reported descriptive results, both studies indicated that different goals are linked to different visual attention patterns. Wästlund et al.'s (2015) results thus strengthened the validity of previous findings, suggesting that a larger sample size was perhaps needed to find the differences between groups. Furthermore, by carrying out data collection in a gas station, Wästlund et al. (2015) further generalised the results to a new setting.

A post-hoc analysis carried out by Wästlund et al. (2015) uncovered further differences between the groups. Participants who purchased at least one unplanned product looked at significantly more AOIs than those in other groups. This finding suggests that consumers who were more visually inquisitive and looked around the grocery store more tended to make unplanned purchases. This group, however, cannot be defined as having a goal in the context of the current literature review, as the consumers did not enter a store aiming to make an unplanned purchase. On store entry, these consumers were part of either group, but perhaps noticing a product in-store reminded them of their needs and resulted in a purchase. The respondents in the planned purchase group on average looked at more AOIs than the respondents in the no purchase group, but this difference was not significant. This finding was consistent with the results for the tasks carried out by each group. Both groups purchased gas, but the planned purchase group also purchased additional products that they intended to purchase. The study did not state the average number of products consumers intended to purchase, but it is likely that if the number was low, it did not make these two tasks substantially different. It was noted by Rayner, Miller and Rotello (2008) that goals need to be different to result in visual attention changes. However, the lack of significant results could have been due to the researchers' use of a post-hoc test to compare the groups. Post-hoc tests rely on a more conservative calculation of a critical value, thus increasing the chance of rejecting a hypothesis. A subsequent study of these two groups may be needed to assess visual attention between the groups.

Overall, the first experiment was based on a large sample of 190 individuals who were asked to undertake their planned shopping at a gas station. The researchers also used non-monetary rewards – a lottery ticket and a car wash voucher – that were unlikely to influence the behaviour of shoppers at the gas station, thus minimising the influence on their behaviour. These methodological approaches were likely to result in reliable data, as the experimental set up was unlikely to have influenced the consumers' normal shopping behaviour.

The second experiment examined how goal specificity influences consumers' visual attention to products in a real sports store. The research also studied how the characteristics of a first task influenced consumers' visual attention during a second, unrelated task. The experimental procedure was as follows. Each respondent was asked to undertake two tasks. During the first task, the respondents were randomly split into two groups and were given different goals. The first group was asked to find a specific jacket (a specific goal), while the second was asked to find a jacket they liked (a more ambiguous goal). For the second task all respondents were asked to find any product they would consider buying for themselves or for someone they knew. The results showed that during the first task, the goal given to the respondents significantly influenced their visual attention to in-store product categories. More specifically, consumers tasked with an ambiguous goal (find any jacket they liked) looked at significantly more AOIs than those looking for a specific jacket. These results further confirmed and validated the findings of Clement (2007), who noted a tendency for consumers with a more specific goal to note fewer products (although this finding was not significant). Furthermore, Wästlund et al. (2015) generalised Clement's (2007) result from a supermarket setting to a sports store, demonstrating that goal specificity influenced consumers in a similar manner across different retail settings. In addition, Wästlund et al.'s (2015) findings generalised Chandon et al.'s (2009) results to a real-life setting.

Furthermore, it was shown that visual behaviour during a second task was influenced by the specificity of a goal during the first task. Consumers performing a specific choice task first looked at significantly fewer AOIs during the second task, whereas consumers with an ambiguous task looked at significantly more AOIs. This finding provides further evidence that goal specificity not only influences visual attention during that specific task, but also has an influence on subsequent tasks.

The results of the second experiment carried out by Wästlund et al. (2015) were based on a smaller sample of 98 respondents who were rewarded with a lottery ticket and a

20% store discount voucher. As a jacket is more expensive than grocery products, it is not feasible to ask respondents to make a real purchase. This may cause respondents feel less motivated and thus less engaged with the task. Therefore, although the experiment was based on a much larger sample than earlier research, the methodology could have had an influence on the behaviour of respondents.

The third experiment aimed to replicate the findings of the second experiment, but with products associated with lower personal cost. The data were collected in a large supermarket. As in the second experiment, the respondents were given two tasks. For the first task, respondents were split into two groups. The first group was asked to choose a specific type of coffee as “requested by the boss”, whereas the second group was asked to choose any ground coffee they liked. The second task asked respondents to choose a pastry they liked. The results showed that the participants in a non-specific group looked at significantly fewer AOIs than those in the specific choice group. This directly contradicted the results of the second experiment and Clement’s (2007) findings.

It should be noted that although the second and the third experiment used a similar methodology, the instructions given to the respondents differed. In the second experiment, the group with a specific goal was asked to find a jacket from an advertisement. In contrast, in the third experiment the premise of the task was to find a coffee brand “requested by the boss”. It could be that in this condition participants felt more pressure to find the correct coffee type which resulted in their spending more visual attention at the shelf to ensure the correct option is chosen. While in comparison, picking a coffee brand they liked may have been a much easier task. Furthermore, the third experiment recruited a sample of students, whereas the second experiment recruited consumers passing by or entering the store. These differences between studies, as well as the difference in the studied product, could explain the conflicting results.

Furthermore, as in the second experiment, consumers who had a specific task first looked at fewer AOIs in their second task, while consumers performing a more ambiguous task first, subsequently looked at more AOIs. This provided further evidence that goals influence visual attention not just during the task, but also in subsequent tasks.

The third experiment was based on a sample of 66 respondents who were given a lottery ticket and a 5% supermarket discount voucher for their participation. However, as in the second experiment, the respondents were not asked to buy a product. As a

result, their behaviour may not have been not representative of shoppers who make a purchase.

Overall, a series of experiments undertaken by Wästlund et al. (2015) showed that goals tend to affect shoppers' visual attention. The first experiment demonstrated that consumers' goals influence their visual attention when making purchases at a gas station. The second experiment showed that consumers with a specific goal direct less visual attention to in-store stimuli than consumers with an ambiguous goal. However, a third experiment found a contrasting result, noting that shoppers with a specific goal looked at more products than those with an ambiguous goal.

2.6.3.1. SUMMARY OF FINDINGS

The evidence presented in this section has demonstrated that goals influence consumers' visual attention, but the strength and direction of the findings are variable. Early research provided some evidence that consumers with different goals exhibit different visual attention patterns, but the results were not significant (Clement, 2007) or descriptive (Harwood and Jones, 2014). However, Wästlund et al. (2015) undertook a range of experiments recruiting a large number of participants and demonstrated that goal generally influences consumers' visual attention patterns.

Furthermore, consumers who have a specific goal may pay less attention to in-store products. Clement (2007) provided an indication that a specific goal, compared with an ambiguous goal, leads to more focused visual attention; however, the results were not statistically significant. This finding was further supported by a second experiment carried out by Wästlund et al. (2015) who noted that consumers given a specific goal looked at significantly less areas of interest than those with an ambiguous goal. Yet a third experiment carried out by Wästlund et al. (2015) yielded the opposite result – consumers with a specific goal looked at more areas than those with an ambiguous goal. However, this discrepancy could have occurred as a result of the different tasks given to the respondents. It should be noted that Clement (2007) and Harwood and Jones (2014) both measured consumer goals and examined the visual attention associated with each goal. However, Wästlund et al. (2015) assigned goals to consumers, thus making their tasks less real.

2.6.4. GAP IN THE LITERATURE AND HYPOTHESIS

The second research question of the current project was to examine how goal specificity affects visual attention to products at the point of purchase in a real shopping environment. The influence of goal type on people's performance has been a popular

research area in the field of psychology since the middle of the 20th century (Locke and Latham, 2002). Research papers have consistently reached a similar conclusion – goal type influences how effectively people perform tasks. More specifically, it has been shown that giving someone a specific, measurable target leads to better, more productive outcomes than setting up an ambiguous goal (Latham and Locke, 1991). Prior research has also shown that goal complexity directly influences the amount of information processing consumers need to make (Ross, 1979). Similarly, a pioneering work by Yarbus (1965) provided an indication that different goals influence the distribution of visual attention to a scenes.

This gap in the marketing literature was noticed by Otterbring et al. (2014) who highlighted the need for future research to examine how goal specificity influences visual attention. Limited research has been conducted to examine the influence of goals on visual attention in a real-life environment. Where this work has been done, it has demonstrated that consumers with different goals exhibit different visual attention patterns (Clement, 2007; Harwood and Jones, 2014; Wästlund et al., 2015). Studies conducted by Clement (2007) and Wästlund et al. (2015) further examined how goal specificity influences visual attention and noted that specific goals tend to lead to less visual attention than ambiguous goals (although Wästlund et al. (2015) reached conflicting results within their study, as discussed in the previous subsection). However, these experiments were carried out in a real environment in a supermarket and a sports store and reached contradictory conclusions. Therefore, the aim of the current project was to address this gap and examine how goal specificity influences visual attention in a novel retail environment.

Real-life and laboratory based studies have yielded similar results, namely that goals influence visual attention. Rayner et al. (2001), Radach et al. (2003), Pieters and Wedel (2007) and Wedel, Pieters and Liechty (2008) showed that groups of consumers with different goals showed different patterns of visual attention to advertisements. Additionally, Radach et al. (2003), Pieters and Wedel (2007) and Rayner, Miller and Rotello (2008) showed that goals influenced visual attention to specific ad elements.

These results imply that in a real shopping environment in a pub, groups of consumers with different goals are likely to exhibit different visual attention patterns. Based on the results of studies conducted in a real environment, it is likely that consumers who enter the venue with a specific goal will exhibit different visual attention patterns than those who have an ambiguous goal. More specifically, a specific goal group is likely to

demonstrate less visual attention to the products than an ambiguous goal group. Based on these observations, the following hypothesis was developed:

H2: A specific shopping goal reduces visual attention to beer brands at point of purchase

2.7. CHOICE – DOWNSTREAM EFFECT

2.7.1. OVERALL CONCEPT

2.7.1.1. CHOICE

Choice is an important, central concept in consumer behaviour research, and a prominent variable in multiple consumer decision-making models (Blackwell, Miniard and Engel, 2006; Peter and Olson, 2010). “Choice” straightforwardly refers to consumers picking one brand or product from a range of alternatives (Alba, Hutchinson and Lynch, 1991). Consumer decision-making models have also shown that attention is an important stage prior to choice (Blackwell, Miniard and Engel, 2006). This implies that making a product more noticeable could increase its likelihood of choice. This link has been noted in the literature; in the field of retail marketing it has been shown that doubling product facings or moving products to the end of aisle display, hence making them easier to notice, significantly and positively affects sales (Wilkinson, Mason and Paksoy, 1982). This finding was further examined by Bemmaor and Mouchoux (1991), who concluded that moving a product to the end of an aisle display dramatically increased the market share of the studied product. Furthermore, using special point of purchase displays to attract attention to the product had a large positive effect on the sales of ground coffee (Guadagni and Little, 1983).

Although these studies theorised that sales increases are likely to be caused by making a product more prominent – either by placing it where more consumers can see it or by making it more noticeable by using further marketing materials at the point of purchase – technological limitations did not allow these assumptions to be empirically tested. However, recent developments in eye-tracking technology enabled researchers to measure consumers’ visual attention, thus allowing them to study the intricacies of visual attention at the point of purchase.

2.7.1.2. CHOICE AND VISUAL ATTENTION

The marketing community – both practitioners and academics – has tended to assume that visual attention and choice are linked (Pieters and Warlop, 1999). Adages such as “unseen is unsold” were used to justify in-store marketing spend in the 20th century

(Chandon et al., 2009, p.15). Although research into this topic has increased in the last few decades, it still remains under-researched compared with other fields of marketing research. A summary of the research papers examining the relationship is provided in Table 5.

The aim of the current project was to investigate how visual attention influences choice in a real environment. However, the literature review showed that only a few papers have investigated the relationship. As a result, the scope of the review was increased to also include studies examining visual attention and choice in a simulated environment with other stimuli – advertising, catalogues, restaurant menus, products and supermarket shelves. Although multiple measures of choice exist in the literature, such as actual choice, purchase intention or measurements of sales, they all are assumed to mean consumer choice in this review.

The examined literature is outlined later in this section. The papers are split into two main groups according to their research setting – laboratory or real-life environment. The laboratory section is split into subsections due to a larger number of studies, grouped according to the stimuli they used – advertising, products and supermarket shelves or POP displays. The literature is arranged chronologically within the subsections. The section concludes with a proposed hypothesis to be examined in the current project and a justification for it.

2.7.2. CHOICE: LABORATORY BASED STUDIES

The current section outlines the studies that looked at the link between visual attention and choice in a laboratory environment using print ads, individual products or supermarket shelf mock-ups.

2.7.2.1. ADVERTISING, CATALOGUES AND RESTAURANT MENUS

Studies using advertising, catalogues and restaurant menus are reviewed in this section, as these stimuli share characteristics and the results from one group can be generalised to others. The academic investigation of visual attention and choice in marketing began in 1979, when Treistman and Gregg published the results of a study they had conducted for Avon – a company selling beauty, household and personal care products via a catalogue. The team aimed to assess the performance of Avon's catalogue and to predict the best performing (as measured by sales) creative execution of a print advertisement. The team selected six diverse product categories and for each category chose two past creative executions advertising each product. A mocked-up Avon catalogue was then created using an ad from each pair together with six other

filler ads, resulting in a brief catalogue with twelve pages. The participants were asked to view the catalogue while their eye movements were recorded, and indicate their purchase intention on a scale. The researchers combined the visual attention data with a purchase intention rating to predict which of the two ads in each category is likely to generate higher sales. As past ads were used, Avon had real sales data to compare with the prediction (the sales data were not communicated to the researchers in advance). The researchers concluded that for five out of six pairs of ads, they were able to predict the ad that generated more sales, although the likelihood that this result was obtained by chance alone was not tested.

As noted, Treistman and Gregg (1979) used purchase intention together with visual attention data to make predictions, whereas the aim of the current review is to examine the studies that assessed the link between visual attention and choice. Furthermore, the researchers compared the visual attention of one group with sales data gathered from a different group. However, as their study represents an important pioneering work on the relationship of visual attention and choice, it was nonetheless included in this review. The authors used a large sample size of 100 individuals, which was an impressive sample at the time, and provided important early indications that visual attention data together with purchase intention can be used to predict a more effective catalogue advertising.

A subsequent study examining the link between visual attention and choice was conducted in the late 1990s, when the Yellow Pages directory was one of the top advertising media in the United States. Lohse (1997) designed an experiment to examine how the visual characteristics of an ad placed in the directory affected choice. The results showed that during page examination, the chosen ad on a page was noted significantly earlier than a non-chosen one. The respondents also tended to revisit the chosen ad and spent 54% more time looking at it, significantly more than non-chosen ads. The causality of the relationship between visual attention and choice could not be determined from the total amount of time respondents looked at the ad – it is possible they looked at it more which caused them to choose it, but it is also possible that they chose it and carried on looking at it. However, it is less likely for consumers to choose an item and then look at it earlier. Therefore, the metrics used provide an indication not only that an association exists between visual attention and choice, but also that visual attention influences choice.

These findings are consistent with earlier observations made by Treistman and Gregg (1979) who noted that creative executions attracting more visual attention also

generated more sales. Lohse (1997) replicated Treistman and Gregg's (1979) findings in a different setting, thus increasing the generalisability of the results. It should be noted, however, that the studies used different measures of choice. Whereas Treistman and Gregg (1979) used externally derived sales figures, Lohse (1997) asked respondents to indicate what business they would choose, using their answers as a measurement of choice. Yet the differences in choice measurements did not appear to influence the results. Furthermore, the findings demonstrated that the chosen ads were not just looked at longer, but also noticed earlier. This suggested a relationship between early attention and choice. Lohse (1997) undertook an important early investigation of how visual attention influences choice. However, the sample used in the study was quite small, consisting of 32 individuals, who were university students. The use of a small sample from a single group of people could have had a negative influence on the validity of the study.

A subsequent investigation of visual attention and choice was undertaken by Janiszewski (1998) who studied the visual attention of consumers during exploratory search. The author measured visual attention as a mediating variable between the size of the products in a catalogue and their sales. The results showed that visual attention was not a significant mediator influencing how the size of the product on a catalogue page and competition for attention (characteristics of items surrounding the product) affect sales. These findings contradict the results reached by Treistman and Gregg (1979) and Lohse (1997), who concluded that visual attention influenced consumer choices. It should be noted that Janiszewski (1998) used real sales figures provided by a retailer whose catalogue was used in a research project, therefore adopting a similar methodology to the one used by Treistman and Gregg (1979). However, this approach did not account for the choices made by the respondents in the study. It is possible that a product that received more sales would not have been chosen by the respondents in the study. This may have reduced the validity of the results, as the visual attention of one group was compared with the sales of another group. Furthermore, the results were based on a relatively small sample of 54 respondents, which increases the chance of obtaining more variable data and thus not finding a relationship.

A direct investigation of the potential link between visual attention and choice was carried out by Lohse and Wu (2001). The researchers aimed to examine whether the visual attention patterns of consumers browsing through the Yellow Pages directory to make a choice differed between cultures. Therefore, the team set out to replicate the results of Lohse (1997), which were based on a sample of respondents from the US, in a new study recruiting consumers in China. The findings directly replicated the

conclusions reached by Lohse (1997). The results showed that advertisements noticed earlier on a page were significantly more likely to be chosen. Furthermore, the ads for chosen businesses were looked at for twice as long as the ones that were not chosen and the difference was statistically significant. Therefore, these metrics imply that there is an association between visual attention and choice, and that visual attention influences choice.

Lohse and Wu (2001) provided an important replication of Lohse's (1997) work. The team doubled the sample size used, recruited respondents from a different geographic region and used pages from a Chinese Yellow Pages directory. Yet, apart from these changes, the study utilised a similar methodology to Lohse (1997), using the same task and procedure. Reaching the same conclusion by selecting a different, larger sample of respondents added further validity and reliability to the results reached by Lohse (1997). This provided additional support that visual attention and choice are connected and that visual attention has the potential to influence choice.

The link between visual attention and choice was the focus of a study by Zhang, Wedel and Pieters (2009), who aimed to establish the extent to which visual attention mediated the relationship between bottom-up feature advertisement characteristics and sales. The findings showed that visual attention to a feature ad has a positive, significant effect on sales of the product, beyond just the presence of an ad. This further demonstrated that greater visual attention was not just associated with greater choice likelihood, as indicated by Treistman and Gregg (1979), Lohse (1997) and Lohse and Wu (2001), but caused greater sales.

Zhang, Wedel and Pieters (2009) used a more robust statistical approach to show that visual attention positively influenced choice. This provided additional support for the conclusion reached by Lohse (1997) and Lohse and Wu (2001), who noted that ads receiving more visual attention earlier in a choice process had a higher likelihood of being chosen, implying that early visual attention influences choice. However, the study contradicted earlier findings reached by Janiszewski (1998), who noted that visual attention did not mediate the relationship between visual attention and sales. Perhaps a larger sample size was needed to uncover the influence of visual attention on choice. It should be noted that just like Treistman and Gregg (1979) and Janiszewski (1998), the study used external sales data as a measure of choice.

Of the studies reviewed in the current section, Zhang, Wedel and Pieters (2009) used the most robust methodology. Although the study measured visual attention and sales separately, both measures were robust. The researchers used 110 feature

advertisements appearing in four Dutch national newspapers as stimuli. Instead of assessing visual attention at one point, the team collected visual attention data week by week as the ads were released, using a random sample of approximately 100 respondents who were asked to look at the advertisements. This approach was most likely driven by the need to obtain the sales data of products week by week, thus requiring the collection of visual attention data for the ads as they were released. However, this approach also minimised the chance of respondents' seeing the ad prior to taking part in the research. It was reported that data collection was done either on the day of the ad release or in the following few days. The sales data were obtained by a consumer panel research company that used a random sample of Dutch households. Given that the researchers studied ads appearing in national newspapers, the usage of sales data from a random sample of households added further validity to the measurements. The robust methodology – a larger probability sample – helped to validate the prior research undertaken by Treistman and Gregg (1979), Lohse (1997) and Lohse and Wu (2001). The consistent finding that visual attention affected and influenced choice increased the reliability of the results.

The research reviewed so far used forms of print advertising as stimuli, whereas Reale and Flint (2016) examined how the ways of presenting nutritional information on restaurant menus affect visual attention and choice. The study did not directly examine the relationship. Instead, it considered how the type of nutritional information presentation influenced visual attention and whether the way information is presented influenced the healthiness of the chosen items (measured as choosing lower calorie alternatives). The results demonstrated that labels presenting health information more directly attracted more of the earlier visual attention of consumers than non-directive labels. However, this difference was not statistically significant. Furthermore, consumers chose meals containing significantly fewer calories when choosing from a directive menu type. Therefore, although the research did not specifically assess the link between visual attention and choice, given the results it is likely that noting health information earlier could have influenced the choices of consumers. This provided some further support for the results of Lohse (1997) and Lohse and Wu (2001), who showed that the items looked at earlier were more likely to be chosen.

As previously noted, Reale and Flint (2016) did not directly examine visual attention and choice. However, due to the limited amount of research in this area, their indicative study was included in this literature review. The results were based on a sample of 84 respondents who were then randomly allocated into groups to view different label designs. This approach probably made the study results more valid by ensuring that

there were no systematic biases in each group. The study demonstrated that the findings reached using advertising stimuli could be generalised and observed during choice tasks using restaurant menus, therefore generalising the results. However, the major disadvantage of this study in the context of the current review was its lack of direct comparison between visual attention and choice.

The visual attention of consumers making a choice from a food and drink fast-food menu was subsequently examined by Kim et al. (2018). The researchers used a similar experimental setup to Reale and Flint (2016) and compared visual attention between three ways of presenting nutritional information. The researchers concluded that visual attention significantly differed between the menu designs and menus with extra visual features (such as colour coding or providing an indicator of physical activity) tended to receive more visual attention. Furthermore, the team concluded that consumers were significantly more likely to select healthier options from menus containing extra visual features.

Therefore, like Reale and Flint (2016), Kim et al.'s (2018) study did not directly examine the relationship between visual attention and choice. However, it provided an indication that consumers looking for longer at the menus with more prominent health information were more likely to make healthier choices. This indicated that directing consumers' attention to important areas could influence their choices. The study further confirmed Reale and Flint's (2016) findings, highlighting that not just noticing items earlier but also looking at them for longer had the potential to influence choice. The study was based on a slightly larger sample of 95 respondents and provided further evidence that visual attention can influence choice.

2.7.2.2. PRODUCTS

The investigation of the influence of visual attention to products on choice was initiated by Krajbich, Armel and Rangel (2010). The researchers aimed to generate a computational model demonstrating the role of visual attention in simple, binary choices. The participants were asked to make a choice between two snack items while their eye movements were recorded. The results demonstrated that the chosen item received significantly longer visual attention. Furthermore, consumers' first fixation length correlated with choice and the last looked at item was more likely to be chosen. These results demonstrated that during a simple choice, items that received greater visual attention were chosen more. Furthermore, the first and last fixations had an important influence, as more attention during those times was associated with a higher choice likelihood. These measures indicated an association between visual attention

and choice, rather than a causal relationship. Although the notion that an earlier noted item was more likely to be chosen indicates that early attention has a potential to influence choice. The study used a small sample of 39 respondents, but each individual was asked to make 100 choices, resulting in a large number of observations. It should be noted that the aim of the study was to collect data to be used to model visual attention in simple choices, so the results may not necessarily be generalisable to other more complex settings.

The study of visual attention and choice from a more complex layout was carried out by Reutskaja et al. (2011). The researchers investigated consumer decision-making and visual behaviour during a product choice. Overall, the team concluded that the items looked at first were significantly more likely to be chosen. As it is less likely that choice influenced the order in which items are noted, their results demonstrated that attracting more visual attention earlier during a decision-making task positively influenced choice likelihood. The results supported those of Krajbich, Armel and Rangel (2010), who noted that early visual attention (longer first fixation duration) is associated with choice, and generalised their results to a more complex display containing four to sixteen products, as both studies used similar stimuli – images of snacks.

The results of Reutskaja et al. (2011) were based on a small sample of 41 participants, each making 75 choices, which resulted in a large number of observations. Furthermore, the respondents were assigned randomly to the experimental condition groups, thus minimising the influence of sample bias on the results. However, the setup of the experiment aimed to examine the choices under time pressure, so all of the respondents had to choose a product in under three seconds, which could have influenced their visual behaviour. It could be hard to generalise the results to other settings as prior research indicated that consumers took longer to make a choice in a more realistic experiment. For example, Chandon et al. (2008) showed that consumers took about 25 seconds to choose a juice, and 18 seconds to choose a laundry detergent.

A subsequent investigation of the link between visual attention and choice was examined by Jantathai et al. (2013). The researchers studied how food colour influenced visual attention and consumers' subsequent choice. The results showed that visual attention as measured by fixation count and visit duration was significantly and positively correlated with product choice. Their result directly confirmed the earlier finding that higher visual attention was associated with product choice (Krajbich, Armel and Rangel, 2010). The findings also partially confirmed the conclusions reached by

Reutskaja et al. (2011), who noted that increased early visual attention is associated with product choice, further validating them as the respondents were given 15 seconds to make a choice. This confirmed that the results remain consistent when consumers are given more realistic time frame to make a decision. The researchers used a sample of 73 respondents who were asked to view images and make a choice from three dessert types in different colours presented in a random order. By using a different stimulus type, Jantathai et al. (2013) generalised Reutskaja et al.'s (2011) findings and demonstrated that visual attention and choice are related whether consumers view products with packaging or images of desserts. However, it should be noted that Jantathai et al. (2013) assessed the correlation between the variables, thus it is also possible that choice influenced visual attention. For example, consumers could have made their choice before announcing it and carried on looking at the chosen item.

Behe et al. (2015) further researched the relationship between visual attention and choice using minimally packaged products – live plants. The researchers aimed to study how involvement influenced visual attention to point of purchase displays, and how visual attention to the products and to point of purchase signs containing information about the product influenced choice. The team concluded that consumers who made a choice spent significantly more time looking at the chosen product, at its information sign and price than on the non-chosen products. These results are consistent with conclusions reached by Jantathai et al. (2013) who showed that when choosing desserts (another product category with no packaging), consumers paid more visual attention to the chosen items. The findings also agree with those of Krajbich, Armel and Rangel (2010), who showed that in simple choices higher visual attention was associated with higher choice likelihood, thus providing further reliability to the results. Nonetheless, these studies examined the association between the variables, preventing causal conclusions from being reached. These findings also supported the results of Reutskaja et al. (2011), who showed that popular snack items receiving more visual attention earlier were more likely to be chosen.

Behe et al. (2015) used a large sample of respondents and utilised an innovative participation reward method in order to encourage consumers to engage in more real-life behaviour, even though the study used images of products, thus making their results more valid. The respondents were asked to make a choice among alternatives and were told that they would receive that product, while its price (9.99, 14.99 and 19.99 US dollars) would be substituted from their 30 US dollar incentive. They were also given the option to not choose any options, in order to make the study design more real. As the study incorporated many aspects of a real shopping trip – for

example, the price of the item was subtracted from their monetary incentive and they were given a physical product they chose – their findings were more likely to be valid. Nonetheless, as the respondents were recruited across multiple platforms – websites, notice boards, etc. – it is possible they did not have a genuine need for a plant and hence resisted making a choice.

In the same year, Van der Laan et al. (2015) set out to examine the effect of first fixation on product choice. Like Krajbich, Armel and Rangel (2010), the researchers conducted their investigation using binary choice. Van der Laan et al. (2015) concluded that participants spent significantly more time looking at the chosen alternative of snack items and bottled dish washing liquids. This directly supported the findings of Krajbich, Armel and Rangel (2010) and generalised the results to a non-food product category. The results were also consistent with those of Jantathai et al. (2013) and Behe et al. (2015), who showed that more visual attention is linked with greater choice, providing further validity and reliability to those findings.

However, Van der Laan et al. (2015) showed that the chosen item was not noticed earlier than the non-chosen one, as measured by the first fixation metric. This finding directly contradicted the results reported by Reutskaja et al. (2011), who concluded that earlier noticed items are more likely to be chosen. This difference may be due to the number of products used in each study. Van der Laan et al. (2015) studied binary choices, therefore each respondent was shown two products at the time. In contrast, Reutskaja et al. (2011) showed four, nine or sixteen products at a time. It is possible that with just two products the location of the first fixation does not influence choice, but with more products on display the effect becomes more noticeable. The study also cannot be directly compared with the results reached by Krajbich, Armel and Rangel (2010), as the researchers compared total fixation duration with choice likelihood and concluded that longer first fixation duration positively influenced choice, while Van der Laan et al. (2015) used the location of first fixation. The durations of first fixations may have been correlated with choice in Van der Laan et al.'s (2015) study, but this was not the metric used by the team. The researchers collected data from a small sample of 23 respondents, but each of them was asked to make 144 choices. As in previous studies, this resulted in a large number of observations and thus more valid results.

Whereas the studies so far examined the link between visual attention and choice predominantly in one product category and focused on snacks and non-packaged products (desserts on a plate and pictures of live plants), Danner et al. (2016) aimed to assess the relationship across multiple product categories. The researchers chose

eight different product categories – apples, beer, bread, chocolate, instant soup, salad, sausage and soft drink – and asked the respondents to make a choice from four options in each category. The researchers used six different measures of visual attention. However, the results demonstrated that for all product categories only three visual attention metrics (fixation count, dwell duration and dwell count) were significantly higher on a chosen than a non-chosen item. Visual attention as measured by fixation duration was significant only for apples, bread and soft drink categories, whereas time to first fixation was only significant for beer category. No differences were found in visual attention as measured by first fixation duration. The results are consistent with previous papers that demonstrated that increased amount of visual attention was associated with increased choice likelihood, such as Krajbich, Armel and Rangel (2010), Jantathai et al. (2013), Behe et al. (2015) and Van der Laan et al. (2015). However, the notion that first fixation duration does not influence choice directly contradicted the results reported by Krajbich, Armel and Rangel (2010). Yet the study also showed that last fixation was significantly more likely to be on the chosen item, thus supporting Krajbich, Armel and Rangel (2010) on this measure. However, as in the previous studies, the methodology only assessed the measure of association between visual attention and choice, and not causation.

By studying eight different product groups, Danner et al. (2016) demonstrated that the relationship between visual attention and choice remained consistent across product groups. However, the study used a relatively small sample of 59 university students and did not state whether the order of displayed products was randomised. This may have affected the validity of the study, as Reutskaja et al. (2011) showed that in a choice set containing four products the items on the top left tended to receive more attention and choice. If the order of the items was not manipulated by Danner et al. (2016), the validity of their results must be questioned, as the findings could have been due to product location. The results also demonstrate that measures of visual attention could influence the outcomes of the research.

2.7.2.3. SUPERMARKET SHELVES AND POINT OF PURCHASE DISPLAYS

The current section examined the studies that investigated the relationship between visual attention and choice using either images of a supermarket shelf, mocked-up real shelves with products that resemble supermarket aisles or other types of POP displays. The early research into the link between the variables was carried out by Russo and Leclerc (1994). The study aimed to examine the visual attention of consumers choosing products from a mocked-up retail shelf and identify the stages of a shopper's

decision-making process. The researchers did not report how visual attention and choice were related throughout the whole shopping journey, but rather they investigated the relationships during the three stages they identified: product exploration, evaluation and pre-choice. During the initial stage of product exploration (sequential examination of all products on display without re-examination), the chosen alternative was looked at more often, but the difference was not statistically significant ($p = 0.06$). During the next stage – evaluation – the chosen item was fixated statistically significantly more often. During the stage just before product choice announcement, the chosen item was looked at less often, but the difference also was not statistically significant. These findings provide an important demonstration that during a decision-making process the relationship between visual attention and the choice could differ. However, the measurement used showed an association between the variables – it could be that respondents had a preference for a product and returned their visual attention to it. The results were also based on an older method of eye-tracking by recording respondent's faces making a choice through a one-way mirror. Thus, it is possible that the visual attention data quality was not robust due to possible human error in coding. The researchers used three product categories – applesauce, ketchup and peanut butter – to broaden their findings. However, the results were also based on a relatively small sample of 47 female respondents, thus limiting the generalisability of the findings.

Another early study looking at visual attention and choice was conducted by Pieters and Warlop (1999). The researchers examined how task pressure and consumer motivation influenced visual attention and choice. The results showed that three of the four visual attention metrics used in the study – fixation duration, intra-brand saccades (visual attention contained within a product) and inter-brand saccades (visual attention between products) – have a significant positive effect on choice. The chosen item was looked at on average 53 ms longer and received on average 2.1 more intra-brand and 1.1 inter-brand saccades than non-chosen items. The fourth measure of visual attention showed that the elements of the chosen brand's packaging (such as brand name, ingredient information) were skipped less often, but the result was not statistically significant. Together these findings demonstrated that a chosen product was looked at longer, that it was re-examined more than competitors', that its packaging was examined in more detail and that less of its packaging information was skipped (although the last measure was not statistically significant). These findings did not directly support the results of Russo and Leclerc (1994), as the researchers used different metrics of visual attention. However, Pieters and Warlop (1999) provided

further evidence that visual attention to chosen and non-chosen items differs throughout the shopping journey, thus expanding on the results of Russo and Leclerc (1994).

The researchers analysed the visual attention data of 54 respondents, but they used a more robust eye-tracking technique than Russo and Leclerc (1994). This may have enabled the researchers to identify the differences between visual attention and choice that were not uncovered by the previous research. Furthermore, Pieters and Warlop (1999) used four different product categories – rice, shampoo, canned soup and salad – thus further generalising the findings to different product categories.

A subsequent large scale study examining visual attention and choice was carried out by Chandon et al. (2009). The aim of the study was to examine how a mix of different in-store factors (the number and position of shelf facings) and out-of-store factors affect visual attention and subsequent choice. The researchers examined the extent to which visual attention mediated the relationships between the number and position of products on product evaluation (consideration and choice). The results demonstrated that an increased number of facings lead to more visual attention that in turn influenced choice. However, product positions on a shelf increased visual attention but did not influence choice.

These results suggest that not all improvements to visual attention have the potential to influence downstream effects such as choice. Overall, these findings indicated that increasing the number of facings of a product, positively influenced visual attention and subsequent choice. Thus, the results were consistent with earlier findings obtained by Russo and Leclerc (1994) and Pieters and Warlop (1999) and demonstrated not only that visual attention and choice are associated, but also that increased visual attention increases choice likelihood. Chandon et al. (2009) used soaps and pain relievers as stimuli in their project, thus further increasing the validity of the findings by generalising the results to a different product category.

Chandon et al.'s (2009) results were based on a large sample of 384 participants who were recruited from eight US cities. They were randomly allocated to different groups to view planograms containing a manipulated number of product facings. A large, geographically dispersed sample and a random allocation were likely to reduce sampling errors and add robustness to the research conclusions. As their results were based on a more robust methodology, they further confirmed the conclusions reached by previous investigators, adding further validity and reliability to the results.

Visual attention as a mediator between position and choice was further investigated by Atalay, Bodur and Rasolofoarison (2012). The researchers carried out a range of experiments to investigate whether placing a product in a horizontal centre of an array influenced consumer's visual attention and choice. The results demonstrated that items placed in a horizontal centre of a display received significantly more total fixation duration, and an increased visual attention led to a significantly higher choice likelihood. Thus, visual attention mediated the relationship between horizontal position and choice. These findings seem to contradict conclusions reached by Chandon et al. (2009), who noted that visual attention did not mediate the relationship between position and choice. However, Chandon et al. (2009) examined all position values – top, middle and bottom vertically, as well as left, centre and right horizontally. Therefore, it is possible that visual attention mediated the relationship between horizontal position and choice, but not vertical position and choice, which resulted in mixed results. Furthermore, Atalay, Bodur and Rasolofoarison (2012) used fictitious vitamin supplements and meal replacement bars as stimuli, whereas Chandon et al. (2009) used real products with just one fictitious brand. Therefore, it is possible that the effect of visual attention was more pronounced when consumers did not know the brands. Nonetheless, the results demonstrated that increased visual attention positively influenced choice, similar to the finding of Chandon et al. (2009). The research also provided further confirmation for the findings of Russo and Leclerc (1994) and Pieters and Warlop (1999), who noted that increased visual attention is associated with choice. By using fictitious brands, the researchers added validity to the results and showed that consumers' attention did not seem to depend on their memory of the product. However, it should be noted that compared with Chandon et al. (2009), Atalay, Bodur and Rasolofoarison (2012) used a much smaller sample of 67 university students, potentially limiting validity of their results.

Behe et al. (2013) investigated how involvement influenced visual attention to store merchandise displays and what effect it has on consumers' likelihood of buying a product. The researchers demonstrated that greater visual attention to a product is associated with a greater likelihood to purchase it. Although the researchers used a scale for purchase intention instead of asking the respondents to make a binary choice, the results were still consistent with previous findings (Russo and Leclerc, 1994; Pieters and Warlop, 1999). This further the results by showing that a different measurement of choice led to the same outcome. However, as previously mentioned, the researchers demonstrated an association between visual attention and choice and not a causal relationship. Additionally, the researchers used live plant displays as

stimuli, whereas prior research used packaged products. This generalised previous results to a novel product group that did not have any protective packaging. Behe et al. (2013) used a large sample of 327 respondents from six North American cities recruited through various means and asked the respondents to look at 32 pictures of plant displays in a random order, while their eye movements were recorded. A large sample of a diverse range of consumers and a randomisation of the order was likely to lead to robust results.

The association between visual attention and choice was also investigated by Clement, Aastrup and Charlotte Forsberg (2015) who looked at how in-store signage and its placement affect visual attention and product choice. In the first experiment the team aimed to shed light on how signage and placement of a national brand and an own brand on a shelf affected visual attention and intention to purchase in a wide range of product categories (toilet cleaner, liquid detergent, mustard, hazel nut spread, salami sausage, spice cookies, dish soap, scouring agent, and ham toppings). The researchers demonstrated that for all categories consumers were significantly more likely to choose a product that they looked at more. These results were consistent with earlier findings of Russo and Leclerc (1994) and demonstrated that the chosen item received more visual attention than the non-chosen item throughout the whole shopping journey and not just during specific stages. Both studies used a sample of female shoppers, therefore by recruiting a similar sample but choosing new stimuli the researchers further generalised the results to a new product category, adding more reliability to the findings. The results are also consistent with the findings of Pieters and Warlop (1999) and Behe et al. (2013), providing further validity to the conclusions. However, recruiting a sample of 80 exclusively female shoppers also limits the generalisability of the study to an overall population of shoppers.

Further investigation into the relationship between visual attention and choice was conducted by Huddleston et al. (2015). The team studied the effect of visual attention to product, information and price signs on purchase intention. No relationship between visual attention and the likelihood of purchasing a product (a measure of choice used by the researchers) was found. Greater fixation duration was associated with slightly higher purchase likelihood, yet fixation count on a product was negatively associated with choice. However, neither difference was significant. Nonetheless, the researchers noted that a type of point of purchase sign (information or price sign) significantly influenced visual attention, and subsequently that sign type had a significant influence on choice. Therefore, although overall no link between visual attention on a product and choice was found, the researchers indicated that drawing more attention to a

product sign has the potential to influence purchase likelihood, but this relationship was not confirmed statistically. Huddleston et al. (2015) used live plants as stimuli and thus their findings stand in sharp contrast to the conclusions reached by Behe et al. (2013), who noted that higher visit duration on a live plant increased its choice likelihood. Furthermore, the finding contradicted the general stance in the literature reviewed so far that increased visual attention influenced choice.

The researchers used a relatively large sample of 97 respondents recruited from garden centres in Australia and the United States. This recruitment strategy was likely to result in a sample of consumers who were more in need of plants, thus addressing the limitation of Behe et al. (2013), who recruited consumers online and at a university. Nonetheless, some other factors may have influenced the relationships between visual attention and choice, as the researchers noted that their model accounted for a small amount of variance.

2.7.2.4. SUMMARY OF FINDINGS

The studies presented in this section demonstrated that visual attention influences choice. The research yielded predominantly consistent results across different stimuli and measurements of choice. In a pioneering study Treisman and Gregg (1979) showed that advertisements attracting more visual attention generated greater sales. Both Lohse (1997) and Lohse and Wu (2001) noted that advertisements for chosen businesses were looked at longer by American and Chinese participants. Reale and Flint (2016) and Kim et al. (2018) demonstrated that a more salient way of presenting health information in food menus tended to result in consumers making healthier choices. All of these studies indicated that visual attention and choice are associated. Yet some papers also examined the direction of relationship between the variables. Lohse (1997) and Lohse and Wu (2001) showed that business ads noted earlier on a page were more likely to be chosen. Whereas Zhang, Wedel and Pieters (2009) concluded that visual attention to products on feature advertisements influenced sales of those products. However, Janiszewski (1998) reached a contradictory conclusion when examining visual attention as a mediator between the size and complexity of an ad and sales.

Similarly, the studies reviewed in this section demonstrated that increased visual attention to a product was associated with increased choice likelihood. This finding was observed in both binary and complex choices and validated across multiple product categories and participants, resulting in consistent and reliable findings (Krajbich, Armel and Rangel, 2010; Jantathai et al., 2013; Behe et al., 2015; Van der Laan et al.,

2015; Danner et al., 2016). However, this observation was reached using correlational analysis, preventing the establishment of causal relationships between the variables. The exception was a study carried out by Reutskaja et al. (2011), who noted that earlier noticed products were more likely to be chosen. As it is less likely that product choice influenced visual attention, the study indicated that attracting early attention improved choice likelihood. Yet researchers such as Van der Laan et al. (2015) and Danner et al. (2016) did not support this finding. Overall, the findings showed that visual attention and choice are linked, although the relationship may depend on the measure of visual attention used.

Additionally, the studies that examined the relationship between visual attention and choice using mocked-up supermarket shelves or point of purchase displays noted that chosen items tended to receive more visual attention. A pioneering study by Russo and Leclerc (1994) showed that the link between visual behaviour and choice may vary between the stages of the consumer decision-making process and concluded that it is the most influential at the evaluation stage. Another early study conducted by Pieters and Warlop (1999) supported the link but demonstrated that the relationship may depend on the measurement used; three measurements were found to be linked to choice, while one was not. Subsequent research by Behe et al. (2013) provided further corroborating evidence, indicating that more visual attention to a live plant increased its purchase likelihood, whereas Clement, Aastrup and Charlotte Forsberg (2015) showed that consumers chose products on a supermarket shelf that they looked at more. However, it should be noted that Huddleston et al. (2015) did not find a relationship between visual attention and choice.

Additionally, a few researchers uncovered a causal link between visual attention and choice. Chandon et al. (2009) demonstrated that the number of facings a product has on a shelf influences the amount of visual attention it receives, which in turn positively affects product choice. Similarly, Atalay, Bodur and Rasolofoarison (2012) concluded that products placed at the horizontal centre of an array generated more visual attention, which is associated with product choice.

2.7.3. CHOICE: REAL-LIFE SHOPPING ENVIRONMENT BASED STUDIES

This section covers studies carried out in a real-life shopping environment. Developments in eye-tracking technology enabled Clement (2007) to publish a pioneering paper examining the influence of visual attention on consumer behaviour in-store. Overall, based on respondents' visual patterns the researchers identified five

stages of consumer decision-making. It was concluded that in the first two stages – called first attention and further attention – there was no difference found in the total fixation duration and average gaze time between chosen and non-chosen products. Therefore, the findings generally confirmed prior results reported by Russo and Leclerc (1994) and demonstrated that consumers' visual attention differed throughout the shopping journey in a real shopping task, not just in a simulated shopping task. Yet Clement's (2007) results directly contradicted Russo and Leclerc's (1994) finding that visual attention to chosen and non-chosen items differs during the first stages of decision-making in a simulated setting. This indicated that visual attention to chosen products in a real supermarket did not significantly differ from that paid to non-chosen ones. Perhaps the result was due to the high variability of the data – the researcher indicated that the time respondents spent in the aisle varied dramatically from 11 to 122 seconds. Thus, it is possible that the true difference between the groups was not observed. Furthermore, the product category may have influenced visual attention. It was noted that overall the chosen jam product was looked at for longer than the non-chosen one, yet the results were reversed for the pasta product category. The researchers also noted that they had 25% more data for the jam category than the pasta category, which perhaps resulted in a less variable sample. This difference between product categories could have caused the researchers to conclude that visual attention did not relate to choice.

It should be noted that although the team recruited 61 respondents, 45 of them were excluded, resulting in a small sample of 16 respondents. Perhaps the use of a much smaller sample than recruited by Russo and Leclerc (1994) and the high variability of the data prevented the researchers from confirming their results. Nonetheless, the team used a robust and realistic procedure to maximise the validity of their results. The researchers asked the respondents to avoid grocery shopping on the day of the experiment and a day prior to that to ensure they had a genuine shopping need. Furthermore, the respondents were not given a reward for taking part and they paid for their shopping themselves. The only direction given by the researcher was to purchase a product from a jam or pasta category. By adopting this approach the researchers minimised the influence of monetary rewards or potentially less natural behaviour when the respondents do not need to make the final purchase. However, perhaps a small sample resulted in highly variable data which did not enable the researcher to uncover true differences in consumer's visual attention.

The relationship was further studied by Otterbring et al. (2014), who looked at the influence of in-store advertisement priming on visual attention and subsequent choice

of a selected product. To ensure that the respondents looked at the in-store stimuli, the researchers pointed at the muesli sign at the aisle end to indicate that the experiment would take place in that aisle. This approach enabled the researchers to ensure that the respondents actually looked at the advertisement and were therefore primed. Subsequently, the respondents were asked to go to that supermarket aisle and pick a product they would like to purchase. It should be noted that the subsequent analysis was only performed for the primed product (the one featuring on the advertisement) and on a control product – a cereal located directly above the primed product on the shelf. The results indicated that the primed product was noticed significantly earlier and received significantly more visits than the control product. Yet this did not lead to greater choice – only 4% of the respondents chose the primed product whereas 45% chose the product they regularly purchased. This indicated that increased visual attention did not influence choice.

Nonetheless, Otterbring et al.'s (2014) research aim was to examine the relationship between primed product, visual attention and choice. As a result, the researchers only assessed visual attention for two products on the supermarket shelf – primed and control product – and the results demonstrated that of these two products, the primed one received more visual attention but not choice. It is therefore possible that consumers looked more at the product they actually chose, but the researchers did not analyse their visual attention to other products. Therefore, this methodological approach limits the generalisability of findings and although the conclusions are in line with results of Clement (2007), the studies cannot be directly compared. At the same time, the researchers used a sample of 69 individuals which they randomly allocated to experimental conditions, thus increasing the validity of the study. However, the respondents were asked to just pick the product up from a shelf and no actual purchase was required, perhaps making the task less realistic.

A further insight into the relationship between visual attention and choice was outlined by Hendrickson and Ailawadi (2014). The authors carried out a range of commercial eye-tracking studies investigating visual attention and purchase in supermarkets and shared some observations and findings from their work. Overall, the team found a weak positive correlation of 0.16 between visual attention to the product sign, packaging and other elements at the point of purchase and product purchase in the category. Yet it should be highlighted that the results were based on proprietary data and the methodology, procedure and sample sizes were not revealed. Additionally, the paper was published in an edited book, rather than a peer-reviewed journal, thus receiving less scrutiny from the academic community. It is also unknown whether the

correlations were statistically significant. Therefore, although the study provided some evidence that greater visual attention to a product category is associated with greater choice, the results were not robust and hence they cannot be directly compared with the previous findings.

A study that predominantly focused on visual attention and product choice was carried out by Gidlöf et al. (2017). The team set out to study how top-down and bottom-up visual attention in a real supermarket influences consumer attention and choice. The researchers indicated that total fixation duration and dwell time significantly and strongly predicted product purchase. Overall, the team noted that not glancing, but looking at the product longer and repeatedly improved the chances of it being bought. The statistical analysis used enabled the researchers to conclude that visual attention affected choice. These findings do not concur with the results outlined earlier in this section, as Clement (2007), Otterbring et al. (2014) and Hendrickson and Ailawadi (2014) showed that visual attention did not influence choice. Yet, as previously pointed out, the latter studies had some important limitations that could have influenced their results. Gidlöf et al. (2017) addressed these limitations – they used a larger sample size of 74 people and analysed all products on the shelf in three studied product categories. The researchers also used cereal, pasta and yoghurt as product categories, therefore allowing a direct comparison with the studies conducted by Clement (2007) and Otterbring et al. (2014). They also controlled for product popularity, facings, saliency and consumer preference when examining visual attention, thus addressing the observations of Otterbring et al. (2014) that consumers choose a product that they regularly purchase. The researchers used the same product category as previous studies, thus replicating them with a larger sample a more thorough analysis. The more robust methodology yielded a different set of results, suggesting that the previous studies, due to their limitations, may have been unable to uncover the association between visual attention and choice. The researchers also indicated that measures of visual attention could influence the relationship.

Gidlöf et al. (2017) aimed to record the natural behaviour of shoppers, so they recruited the respondents at supermarket entry and asked them to carry out their planned shopping trip but in addition to purchase products from the three studied product categories. The respondents had to choose and pay for the products, but they were paid an amount large enough to cover the purchases of even premium products in those categories. Thus, some of the respondents could have been influenced by the reward to purchase a more premium product. However, as the consumers were asked to undertake the whole shopping journey, it is likely they exhibited their regular

behaviour. Furthermore, the respondents were quite young on average – 21 and 23 years old. This may have limited the generalisability of the study to other age groups of shoppers.

2.7.3.1. SUMMARY OF FINDINGS

Although the prior sections demonstrated that visual attention and choice are related, the results appear to be more diverse in the studies carried out in real environment. Earlier research carried out by Clement (2007) and Otterbring et al. (2014) found no difference in consumers' visual attention to chosen and non-chosen products. In contrast, Hendrickson and Ailawadi (2014) noted that in the commercial studies they undertook, they found a weak correlation between the variables. However, as the study did not share the methodologies of those projects it is not possible to examine the strength of the claim. Yet a more recent study carried out by Gidlöf et al. (2017) addressed some of the limitations of the earlier research and noted that longer visual attention to a product positively influences its choice likelihood.

2.7.4. GAP IN THE LITERATURE AND HYPOTHESIS

A third research question posed in the current project was to examine the association between visual attention and product choice. Early retail marketing research has demonstrated that making a product more visually salient at the point of purchase, such as by moving it to a more prominent position or increasing the number of its facings, led to higher sales (Wilkinson, Mason and Paksoy, 1982). Similarly, using point of purchase signs was shown to increase the sales of the products in a retail store (Guadagni and Little, 1983). These findings perhaps established an overall belief by academics and practitioners that visual attention and choice are linked.

Systematic empirical investigation of the relationships started in the last few decades. Pieters and Wedel (2004), Wedel and Pieters (2008a) and Clement, Kristensen and Grønhaug (2013) all called for further investigation of the influence of visual attention on downstream effects – memory, consideration and choice. More recently, Huddleston et al. (2018) reinforced this notion and highlighted the need to examine the relationship between visual attention and choice in a real shopping environment. Although a few papers have investigated the relationship, their findings were quite mixed. Early research by Clement (2007) and Otterbring et al. (2014) carried out in a real environment did not uncover the link between visual attention and choice. The association was hinted at by Hendrickson and Ailawadi (2014), who reported a weak positive correlation between the variables. However, a more methodologically robust

study carried out by Gidlöf et al. (2017) noted that longer visual attention to a brand increased its choice likelihood. However, these studies focused on examining the link in one type of retail shopping environment – a supermarket. Therefore, the aim of the current project was to address the gap in the literature and to investigate how visual attention and choice are linked in a novel real-life environment – a pub.

As the research findings conducted in a real environment were mixed and limited, studies carried out in a laboratory environment were also used to develop the hypothesis. The studies that assessed the relationship between visual attention and choice using print media – advertisements, catalogues and restaurant menus – showed that visual attention and choice are related. Treistman and Gregg (1979) demonstrated that ads generating more visual attention also generated more sales. Lohse (1997) and Lohse and Wu (2001) showed that chosen businesses from the Yellow Page catalogue received more visual attention. In contrast, Reale and Flint (2016) and Kim et al. (2018) showed that a more prominent way of presenting health information led to consumers noting it and choosing healthier product options.

Similarly, research conducted using products as stimuli showed that brands that attracted greater visual attention were also chosen more (Krajchich, Armel and Rangel, 2010; Jantathai et al., 2013; Behe et al., 2015; Van der Laan et al., 2015; Danner et al., 2016). The findings were consistent across different experimental setups, samples and product categories.

The researchers using mocked-up supermarket shelves and point of purchase displays also demonstrated the link between visual attention and choice. Russo and Leclerc (1994) found that visual attention and choice are related at the early stages of consumer decision-making. In contrast, Pieters and Warlop (1999) showed that visual attention and choice are connected, but that this could depend on the measures used. Additionally, Behe et al. (2013) and Clement, Aastrup and Charlotte Forsberg (2015) demonstrated that greater visual attention is associated with greater choice. Furthermore, Chandon et al. (2009) and Atalay, Bodur and Rasolofoarison (2012) highlighted a causal relationship between the variables, demonstrating that greater visual attention increased choice likelihood.

Taken together, these results showed that greater visual attention and choice are associated, and that visual attention is likely to influence product choices. This implied that products that receive more visual attention at a point of purchase in a real pub are also likely to have a greater choice likelihood. Additionally, the findings showed that consumers are likely to pay more visual attention to the chosen than the non-chosen

products. Furthermore, the results indicated that brands noted earlier are more likely to be chosen. Based on the literature findings outlined, the following hypothesis is proposed:

H3: Increased visual attention to a brand leads to an increased likelihood of it being chosen

2.8. SUMMARY

This section introduced the concept of visual attention, noted how the anatomical structure of human eyes enables researchers to quantify people's visual attention and outlined the established theory of visual attention. The literature that examined how familiarity and goals influence visual attention and how visual attention is associated with choice was reviewed. Based on this review, the following hypotheses to be tested in the current project were proposed:

H1a: Greater familiarity with the pub venue reduces visual attention to the in-store environment

H1b: Greater familiarity with the pub venue reduces visual attention to beer brands at the point of purchase

H2: A specific shopping goal reduces visual attention to beer brands at point of purchase

H3: Increased visual attention to a brand leads to an increased likelihood of it being chosen

The next section outlines the methodology used in the current project to test these hypotheses.

3. METHODOLOGY

This chapter describes the methodology used to test the hypotheses outlined in the previous section. It is crucial to understand the theoretical perspectives and paradigms underpinning the research as it shapes the assumptions made about the nature of knowledge, influences the methods and subsequent findings of a research project (Saunders, Lewis and Thornhill, 2016). The section starts by discussing the possible research philosophy and research design options that are available to the researchers. Each subsection is concluded with an outline of a stance taken or an approach chosen by the current project. The following section, data collection, in depth outlines the actual data collection process of the study – its research design, location, participants, stimuli, equipment, measures and procedure. Subsequently, the research design quality – validity and reliability – is introduced and discussed in relation to the current project. Lastly, data analysis of the current project is presented.

3.1. RESEARCH PHILOSOPHY

Research philosophy identifies “a system of beliefs and assumptions about the development of knowledge” (Saunders, Lewis and Thornhill, 2016, p.124). The understanding of research philosophy is crucial as it enables the researcher to identify the types of research questions, approaches and methods that could be used in the chosen field. It also shapes what is viewed to be an acceptable evidence of a studied phenomenon within the chosen paradigm and guides the types of research findings that could be reached (Denscombe, 2010). The process of identifying philosophical stances aims to ensure that the research is more sound and the findings are more convincing (Crotty, 1998). Throughout the years unique research philosophies were identified which are characterised by a range of assumptions about ontology, epistemology and research approach, discussed in the following subsections.

3.1.1. ONTOLOGY

Ontology refers to “the nature of existence and what constitutes reality” (Gray, 2014, p.19), with researchers identifying a range of ontological positions. Easterby-Smith et al. (2018) summarised the stances on a continuum ranging from realism on one extreme to nominalism on another, as shown in Figure 6.



Figure 6: Continuum of ontological positions (Easterby-Smith et al., 2018, p.64)

Realism states that reality is objective and all social phenomena occur free from outside control of social actors (Matthews and Ross, 2010). This approach assumes that social and physical phenomena are universal, hence allowing the researcher to observe, measure and study the phenomenon (Saunders, Lewis and Thornhill, 2016). Realism is most commonly used by the researchers in the natural sciences studying the physical world of animals, plants, cells, atoms nuclei and chemical elements (Matthews and Ross, 2010). Predominantly, the aim of the research embracing realism is to create law-like generalisations about the studied phenomena (Saunders, Lewis and Thornhill, 2016).

Another stance outlined by Easterby-Smith et al. (2018) is internal realism and it is similar to realism in that it believes the reality is independent from a researcher and that discovered laws are universal. However, in contrast, it assumes that the studied phenomenon cannot be observed directly (Easterby-Smith et al., 2018). The approach is also used in natural sciences for example by scientists studying sub-atomic particles – they cannot be directly seen by a researcher, but their interaction with other elements can be measured and therefore studied.

The next position along the continuum is relativism. This position affirms that there are multiple “truths” and the reality is more subjective. Hence, the theories and laws are influenced by the views of a researcher and other interested groups (Easterby-Smith et al., 2018). This results in the cases where the same evidence could be interpreted differently by different groups. Easterby-Smith et al. (2018) noted that climate change research falls under this category as although the same evidence is available to all stakeholders, they reach conflicting conclusions.

Nominalist position is a complete opposite of realism. It assumes that the reality is entirely subjective and is created by social actors through their interaction with other people (Denscombe, 2010). Hence, individuals may have different beliefs about the reality depending on their group belonging or culture (Gray, 2014). This enables

multiple contradicting explanations of a phenomenon to exist (Gray, 2014). This approach places an important role on names and the language used about phenomenon (Easterby-Smith et al., 2018).

Ontology of the current study

The aim of the current project was to investigate visual attention of consumers in a real environment, by measuring and comparing it between the groups of participants. It was therefore assumed that it is possible to objectively measure visual attention of humans. Thus implying that the concept of visual attention is independent from the observer, leaning towards a more realist ontology from a continuum presented in Figure 6. However, the processing of visual attention occurs in the human brain and thus cannot be directly observed. Yet, it can be indirectly assessed by examining, recording and quantifying the eye movements of humans using the eye-tracking equipment. Additionally, it is assumed that visual attention of humans can be systematically influenced by other factors and that it can subsequently affect other consumer behaviour such as product choice. Based on these assumptions, the most appropriate ontology for the study was internal realism.

3.1.2. EPISTEMOLOGY

Whereas ontology specifies what reality is considered to be, epistemology indicates what types of knowledge are considered to be acceptable (Gray, 2014). For example, whether a researcher needs measurable, robust, factual data or narrative, qualitative, even fictional accounts to study the research question (Saunders, Lewis and Thornhill, 2016). A number of research philosophies characterised by unique features are outlined in the literature. The current section follows the definitions suggested by Easterby-Smith et al. (2018), who define strong positivism and strong interpretivism as two extreme contrasting epistemological positions with a range of options in the middle, as shown in Figure 7. The authors noted that the researchers do not always assume one specific position, they could mix their assumptions to achieve the research goals.



Figure 7: Continuum of epistemologies (Adapted from Easterby-Smith et al., 2018, p.72)

The predominant feature of strong positivism is the view that the social world exists outside of a researcher and can therefore be directly measured (Easterby-Smith et al., 2018). The researchers adopting positivist philosophy “focus on strictly scientific empiricist method designed to yield pure data and facts uninfluenced by human interpretation or bias” (Saunders, Lewis and Thornhill, 2016, p.136). Positivism tends to adopt realist ontological position. This approach is the most popular among natural scientists who study existing theory, generate a hypothesis and then collect the data to test it and eventually formulate universally generalisable laws and theories (Denscombe, 2010). These assumptions can generate strong support for studied hypothesis; however, as this method is predominantly used in natural sciences, the same assumptions cannot always be used in social experiments (Easterby-Smith et al., 2018). Furthermore, the studied research hypotheses under a positivist position tend to be narrow and, given the assumptions, the results are presented as objective facts which may not necessarily be the case in business and social sciences research (Gray, 2014). Some further differences between strong positivism and strong interpretivism are summarised in Table 6.

| Strong positivism tends to: | Strong interpretivism tends to: |
|-------------------------------------------------------------------|------------------------------------------------------------------------------|
| Use large samples | Use small samples |
| Have an artificial location | Have a natural location |
| Be concerned with hypothesis testing | Be concerned with generating theory |
| Produce precise, objective, quantitative data | Produce “rich” subjective, qualitative data |
| Produce results with high reliability but low validity | Produce findings with low reliability but high validity |
| Allow results to be generalised from the sample to the population | Allow findings to be generalised from one setting to another similar setting |

Table 6: Features of two main epistemological paradigms (Adapted from Collis and Hussey, 2014, p.50)

A less strong version of positivism – or just positivism as noted by Easterby-Smith et al. (2018) – has many of the characteristics of strong positivism but it assumes that the reality, although objective, cannot be observed directly. This view tends to be used together with internal realist ontology. Rather than only relying on large samples of quantitative data this position allows the use of qualitative data (Easterby-Smith et al., 2018). These differences address some of the limitations of strong positivism – the research questions tend to be broader and the research takes less time. However, this approach still predominantly focuses on hypothesis testing which could make the

findings artificial and as a result is not good for generating new theory (Easterby-Smith et al., 2018).

The next identified philosophy is interpretivism, which is a less strong version of strong interpretivism. This approach notes that people and institutions are substantially different from the concepts studied by the natural scientists and hence the same thinking cannot be applied to social research (Bryman and Bell, 2015). Interpretivists assume that there are multiple realities created by social actors and hence different views need to be gathered to answer the research questions (Easterby-Smith et al., 2018). Given these assumptions, this philosophical stance is used with the relativist ontological position. As it is believed that different realities exist, the research tends to be based on mixed methods combining quantitative and qualitative data (Easterby-Smith et al., 2018). This approach enables to generate theories and study processes in more depth; however, the results may be influenced by institutional and cultural differences (Easterby-Smith et al., 2018).

Strong interpretivism is a complete opposite of strong positivism. It is assumed that there is no existing reality, rather that the aim of the research is to uncover and describe the structures invented by social actors (Easterby-Smith et al., 2018). Thus, strong interpretivism is linked with nominalist ontological stance. The researchers are integrated in the research process and thus their values and beliefs influence the research process (Saunders, Lewis and Thornhill, 2016). The research adopting this view tends to focus on rich qualitative data and aims to describe the unique phenomena under investigation (Sekaran and Bougie, 2016). These studies are useful for describing detailed processes in organisations and producing in-depth theories based on real data. However, vast amounts of qualitative data may be time consuming to analyse and interpret and the findings could be hard to generalise to other settings (Easterby-Smith et al., 2018).

Epistemology of the current study

The aim of the research project was to measure and quantify visual attention of shoppers in a real environment. Collected quantitative data from many individuals was subsequently used to test the research hypotheses to assess the differences between the groups of consumers, and to examine the influence of visual attention on product choices. The researcher was independent from the study and it was assumed that it was possible to gather objective evidence to test the hypotheses. These assumptions are more congruent with the positivist end of continuum demonstrated in Figure 7. However, the aim of the project was not to create law-like generalisations, which is a

feature of strong positivism (Saunders, Lewis and Thornhill, 2016), rather to test existing theory in a novel setting. Thus, the current project adopted a positivist view as it is the most appropriate approach for answering the research questions and is consistent with the chosen internal realism ontology.

3.1.3. RESEARCH APPROACH

The research literature identifies three main approaches of theory development – deductive, inductive and abductive – which are examined in this section.

Deductive research is a research process where an investigator begins the project by developing a theoretical framework and a research hypothesis, which is subsequently empirically tested (Easterby-Smith et al., 2018). Hence, a researcher starts with a broad idea and then makes it more specific as the research progresses (Collis and Hussey, 2014). The aim of the deductive approach is to test the hypothesis and either accept or reject it (Saunders, Lewis and Thornhill, 2016).

In contrast, inductive research starts with data collection which is then followed by theory development or identification of relationships between variables (Saunders, Lewis and Thornhill, 2016). The researchers still explore academic theory, however the exploration does not provide a concrete hypothesis to be tested (Gray, 2014). The inductive approach aims to create and expand on the existing theory (Saunders, Lewis and Thornhill, 2016).

Abductive approach combines both deductive and abductive research approaches in one project. The researcher could start with data collection, identify a relationship between certain variables and then conduct further data analysis specifically testing the relationship or the other way around (Saunders, Lewis and Thornhill, 2016).

Research approach of the current study

The aim of the project was to investigate visual attention in a real environment. The study began by examining existing literature and formulated research hypotheses to be tested in the current project based on existing theory of visual attention. Subsequently, a methodology was designed to gather data to test the identified hypotheses. Thus, the current project used a deductive research approach. This approach is compatible with internal realism ontology and positivism epistemology.

3.2. RESEARCH DESIGN

The current section outlines research purpose and method, discusses research strategy, locations, sampling and data collection techniques.

3.2.1. RESEARCH DESIGN PURPOSE

The research purpose refers to the objective of the research project and is shaped by its research questions (Saunders, Lewis and Thornhill, 2016). The literature identifies a range of different purposes such as exploratory, descriptive, explanatory and evaluative.

Exploratory purpose aims to expose an issue, to uncover a problem or to deepen an understanding of a phenomenon (Saunders, Lewis and Thornhill, 2016). It is often carried out when limited information is available on the subject (Collis and Hussey, 2014). Thus, exploring the topic, assessing whether it is worthwhile to pursue it further and if so identifying the means of doing it (Gray, 2014). Exploratory research collects quantitative and qualitative data using a wide range of strategies such as case studies, observations, in-depth interviews or focus groups (Saunders, Lewis and Thornhill, 2016). The approach tends to be unstructured and the research questions are redefined and clarified during the research process (Saunders, Lewis and Thornhill, 2016).

Descriptive research outlines the studied phenomena and deepens the knowledge about its characteristics (Collis and Hussey, 2014). This research aims to describe the situation or person, or to demonstrate how things are linked together (Gray, 2014). The researcher needs to have a clear understanding of what is being studied prior to data collection (Saunders, Lewis and Thornhill, 2016). Thus, descriptive research requires an extensive review of literature or a preceding exploratory study which identifies a research question (Hair et al., 2016). The data tends to be collected in a more structured manner, whether it is an observation or an interview (Hair et al., 2016).

Explanatory research goes a step further than descriptive research and aims to examine the link between studied variables (Saunders, Lewis and Thornhill, 2016). Most commonly, the researchers look for causal relationships between the variables to indicate whether a change in one variable influences another variable (Hair et al., 2016). During data collection a particular emphasis is put on identification and control of other non-studied variables to reduce their influences (Collis and Hussey, 2014). The research project tends to test a specific hypothesis using qualitative data (Saunders,

Lewis and Thornhill, 2016). The strengths of the relationship is then tested using statistical techniques (Collis and Hussey, 2014).

Lastly, evaluative research focuses on examining and outlying how studied items and processes work (Saunders, Lewis and Thornhill, 2016). In the business context, evaluative research focuses on evaluating how effective something is, such as a marketing campaign, a business strategy or a delivery of a service between locations or groups of consumers (Saunders, Lewis and Thornhill, 2016). The study is likely to be qualitative in nature, aiming to expand the current theory (Gray, 2014).

Research purpose of the current study

The conducted literature review showed that the topic of visual attention in a real shopping environment has not been widely researched. However, the aim of the current project was to test specific research hypotheses which were developed based on the available, although limited, research findings. The study assessed how familiarity with the venue and goals influence visual attention, and the association between visual attention and choice. Thus, the study adopted explanatory research design purpose.

3.2.2. RESEARCH METHOD

This section outlines three types of research methods – quantitative, qualitative and mixed. Although different approaches are outlined, it should be noted that neither approach is better, rather they allow to answer different types of research questions (Hair et al., 2016).

Quantitative research is predominantly based on collecting and using structured data which could be expressed numerically (Matthews and Ross, 2010). This research type assumes that the reality is objective and the elements of the physical world can be measured (Matthews and Ross, 2010). Hence, the researchers aim to numerically measure a phenomenon and gather data to empirically test the hypotheses identified after conducting the literature review (Bryman and Bell, 2015). As the data is numerical, the role of the researcher becomes more objective (Hair et al., 2016). Thus, this type is commonly associated with positivist research philosophy and deductive approach to theory development (Collis and Hussey, 2014).

In contrast to quantitative research design, qualitative design focuses on textual and visual descriptions and tends to examine stories and accounts, subjective understandings, feelings, opinions and beliefs (Hair et al., 2016; Matthews and Ross, 2010). It operates under the assumption that social actors create meaning and hence is

linked to interpretivist philosophy and inductive approach to theory development (Saunders, Lewis and Thornhill, 2016). The research process under this approach tends to be less structured and the research questions could evolve during the research process (Saunders, Lewis and Thornhill, 2016). Data collection often occur in a natural setting where the researcher interacts with participants and subsequently interprets their responses, making the results more subjective (Hair et al., 2016).

Some further differences between quantitative and qualitative approaches are outlined in the Table 7.

| Description | Quantitative approach | Qualitative approach |
|-------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Purpose | Collect quantitative data | Collect qualitative data |
| | More useful for testing | More useful for discovering |
| | Provides summary information on many characteristics | Provides in-depth (deeper understanding) information on a few characteristics |
| | Useful in tracking trends | Discovers hidden motivations and values |
| Properties | More structured data collection techniques and objective ratings | More unstructured data techniques requiring subjective interpretation |
| | Higher concern for representativeness | Less concern for representativeness |
| | Emphasis on achieving reliability and validity of measures used | Emphasis on trustworthiness of respondents |
| | Relatively short interviews (one to twenty minutes) | Relatively long interviews (thirty minutes to many hours) |
| | Large samples (over fifty) | Small samples (one to fifty) |
| | Results relatively objective | Results relatively subjective |

Table 7: Comparison of quantitative and qualitative research methods (Adapted from Hair et al., 2016, p.154)

Mixed method research design combines at least one quantitative and one qualitative technique (Gray, 2014). Using multiple methods within a single study can help to address the limitations of individual methods (Gray, 2014). Furthermore, this approach allows the researcher to simultaneously generalise from a sample and generate theory in one research project (Gray, 2014). This approach tends to believe that although there is an objective reality, social actors can interpret it differently based on their

experiences (Saunders, Lewis and Thornhill, 2016). Thus, it is likely to use a mixture of research philosophies and theory generation approaches (Gray, 2014).

Research method of the current study

The aim of the current project was to record and quantify visual attention of shoppers in a real environment and to test specific hypotheses by comparing the amount of visual attention between groups, and by examining the strength of relationship between visual attention and choice. Therefore, quantitative research design was the most appropriate design for the current project as it enabled to test the hypotheses identified in the literature review and answer the research questions. Visual attention was objectively measured using the eye-tracking equipment, generating numeric measures of the studied phenomenon. This approach is consistent with internal realism ontology and positivism epistemology adopted by the current project.

3.2.3. RESEARCH STRATEGY

Research strategy is defined as a plan outlining how a researcher is going to address its objectives and research questions (Saunders, Lewis and Thornhill, 2016). As there is no existing secondary data which could be used to test the hypotheses of the current project, the researcher needs to collect primary data – data gathered from an original source (Collis and Hussey, 2014). The current section outlines the most commonly used research strategies to collect primary data in the business research, summarises their unique features, notes the research philosophies guiding them and lists their advantages and disadvantages.

Experiment and quasi-experiment

Experiment strategy is characterised by a rigid control of the research process with the aim to assess the probability that changing one variable (referred to as an independent variable) results in a change in another variable (called a dependent variable) (Gray, 2014). Thus, experiments allow to establish cause and effect relationships between the variables (Bryman and Bell, 2015). Two major types of experiments are defined – a classic experiment and a quasi-experiment (Bryman and Bell, 2015). In a classic experiment, researchers conduct an extensive literature review, formulate a causal hypothesis and define independent and dependent variables of the research project (Brysbaert, 2011). Then, the respondents are randomly split into experimental groups with different interventions based on the levels on an independent variable, followed by measurement of dependent variable (Saunders, Lewis and Thornhill, 2016). Random allocation of respondents in different groups allows to minimise the influence of other

variables and gain confidence that the observed differences in measurements of dependent variables are caused by the manipulation of the independent variable (Bryman and Bell, 2015). The aim is then to empirically test whether the differences between groups are linked to different measures of dependent variable (Bryman and Bell, 2015). The purpose of an experiment is to statistically test a specific, clearly defined hypothesis by collecting objective numeric data (Saunders, Lewis and Thornhill, 2016). Experiments predominantly take place in a laboratory or artificial settings to minimise the influence of other variables and to have a greater control over the experiment (Matthews and Ross, 2010). Hence, providing robust and trustworthy support for causal findings (Bryman and Bell, 2015). These assumptions make it a predominant strategy used in natural sciences and a common strategy used in psychology and social sciences (Saunders, Lewis and Thornhill, 2016). This strategy is associated with pragmatist research philosophy, deductive approach to theory development and quantitative research design (Easterby-Smith et al., 2018).

The advantage of a classical experiment design is that it provides quite specific and generalisable findings, which tend to be easier to replicate by other researchers (Easterby-Smith et al., 2018). However, on the other hand they tend to examine only a narrow and specific hypothesis predominantly in an artificial environment which is not always generalisable to the real environment (Collis and Hussey, 2014). Furthermore, it is not always possible to carry out classical experiments in the business environment due to practical and ethical reasons (Easterby-Smith et al., 2018).

In contrast, a quasi-experiment strategy predominantly adheres to the same principles and process as a classical experiment but the researcher does not randomly allocate respondents in groups as in certain cases randomisation is not possible (Saunders, Lewis and Thornhill, 2016). Thus, during a classical experiment the researcher manipulates an independent variable, whereas during quasi-experiment that variable is observed (Gray, 2014). Quasi-experiments are often used in business research as some studied variables cannot be manipulated (Bryman and Bell, 2015). For example, the gender of respondents cannot be manipulated or in organisational studies workers may already work in certain groups and the reallocation is not possible (Saunders, Lewis and Thornhill, 2016; Bryman and Bell, 2015). Grant and Wall (2009, p.653) noted some further benefits of quasi-experiments, such as they are:

1. *Strengthening causal inference when random assignment and controlled manipulation are not possible or ethical;*
2. *Building better theories of time and temporal progression;*

3. *Minimizing ethical dilemmas of harm, inequity, paternalism, and deception;*
4. *Facilitating collaboration with practitioners;*
5. *Using context to explain conflicting findings.*

Business research using quasi-experiment strategy tends to take place in a natural setting, thus addressing some of the limitations of classical experiments and making the findings more applicable to real-life (Bryman and Bell, 2015). Yet, on the other hand it tends to be much harder to recruit participants for research taking place in real environment (Collis and Hussey, 2014). Also, while field or real-life experiments provide a more natural environment, there is less control over studied variables thus making the findings less robust compared to those of classical experiments (Collis and Hussey, 2014). Nonetheless, a quasi-experiment is the most robust way of identifying causal inferences when allocation of respondents into groups is not possible (Gray, 2014).

Survey

Survey is one of the most common methodologies used in business research (Gray, 2014). It aims to collect standardised data from a large number of respondents to measure and assess their knowledge, attitudes and behaviour (Sekaran and Bougie, 2016). Surveys aim to provide an in-depth description of a population by collecting data from a selected sample (Gray, 2014). Survey research tends to be used in exploratory and descriptive research (Sekaran and Bougie, 2016). Most surveys collect data using questionnaires, however some include structured observations and interviews (Gray, 2014).

Two types of surveys are defined – descriptive and analytical (Collis and Hussey, 2014). Descriptive surveys tend to assess characteristics of a specific population at a single point in time or observe the variables changing over a long period of time (Bryman and Bell, 2015). The strategy often utilises open-ended questions to collect qualitative data and then formulate the theory, thus adopting inductive approach to theory development (Collis and Hussey, 2014). The research using descriptive surveys tends to have an interpretivism research philosophy (Collis and Hussey, 2014). Whereas analytical surveys aim to assess the relationship between certain variables (Collis and Hussey, 2014). Hence, sharing some characteristics with the experiment strategy. Analytical surveys tend to adopt a positivist view and inductive research approach (Gray, 2014). Research is likely to be based on quantitative data which is then analysed using inferential statistics (Saunders, Lewis and Thornhill, 2016).

Surveys allow to economically collect large amounts of data from a large sample and to provide some evidence for relationships between the studied variables (Saunders, Lewis and Thornhill, 2016). However, the quality of survey results often depends on the representativeness of its sample, which could be hard to achieve (Saunders, Lewis and Thornhill, 2016).

Case study

Case study focuses on detailed examination of one or a few organisations, locations, events or individuals in a natural setting (Easterby-Smith et al., 2018). It is a widely used approach in business research and is often used to look at evaluation of specific programmes or projects, organisational performance between sectors or companies (Gray, 2014). Case study approach assumes that to get an understanding of an organisation or a situation the researcher needs to assess a real example (Hair et al., 2016). In order to address a research question the researcher needs to examine the situation in a natural environment and to collect a range of data to describe it and reach conclusions (Sekaran and Bougie, 2016). The researcher needs to also identify the unit of analysis or what is being studied, such as a whole organisation, a department or a specific project, and a timeframe – when does the research start and end (Hair et al., 2016). Case study strategy is often used to inspire new ideas, illustrate abstract concepts and develop hypothesis to be examined in the subsequent research projects (Saunders, Lewis and Thornhill, 2016). However, it can also be used to assess specific research questions (Easterby-Smith et al., 2018).

Broadly, two types of case study research are identified. The first type focuses on a single case and is likely to adopt a more interpretivist philosophy and inductive approach to theory development (Easterby-Smith et al., 2018). In this case, the research focuses more on outlining detailed accounts of organisational behaviour (Easterby-Smith et al., 2018). This approach tends to favour qualitative data and uses a wide ranging data collection methods such as archives, interviews, surveys and participant observation, often combining them to produce more in-depth accounts (Gray, 2014). A second approach looked at multiple cases aiming to compare them and to provide further generalisation to other settings (Easterby-Smith et al., 2018). The assumption of this approach is to examine whether the studied phenomena occurs in multiple cases (Saunders, Lewis and Thornhill, 2016). This approach tends to have a more positivist view and is likely to use an inductive approach identifying a specific research question and in some cases a hypothesis to be tested (Saunders, Lewis and Thornhill, 2016). Both quantitative and qualitative data is likely to be used, gathered

through a wide range of techniques (Matthews and Ross, 2010). In this case, the researcher aims not just to describe the situation but also attribute causal meaning and suggest potential causal links (Gray, 2014).

Case study approach is useful for providing rich, in-depth accounts about phenomena and people interacting with the natural environment (Saunders, Lewis and Thornhill, 2016). However, it is criticised for being less rigorous and for producing less generalisable findings (Easterby-Smith et al., 2018). Furthermore, it could be difficult to get access to the setting and research could be very time consuming (Collis and Hussey, 2014).

Ethnography

Ethnography sets out to understand cultural or social phenomena and how people interact and behave in real environments (Gray, 2014). It entails the researcher integrating into a studied group in order to better understand participant's behaviour and their interaction with the setting (Easterby-Smith et al., 2018). Ethnography is similar to a case study, but the researcher is immersed in the studied environment seeking a much deeper understanding of the subject by experiencing it first-hand (Matthews and Ross, 2010). For example, the researcher not just observes the workers, but also takes part in the activities they perform (Collis and Hussey, 2014). The aim of ethnography is to describe the social world of a specific social group as the members see it (Collis and Hussey, 2014). The research could examine the interactions at different levels – street level, work group, within an organisation or society (Saunders, Lewis and Thornhill, 2016). While being part of the studied group, the researcher observes, listens and asks questions from other members (Sekaran and Bougie, 2016).

Ethnography tends to adopt strong interpretivism research philosophy (Easterby-Smith et al., 2018). The research also usually adopts inductive approach to theory development. This approach tends to be used to develop theories, but in some cases can also test existing theories (Gray, 2014). The research is predominantly based on qualitative data with a range of data collection techniques such as observation, interviews and documents, often combining all three (Gray, 2014). The researcher also compiles long and detailed notes of participant's behaviour during the research process and incorporates them into the research (Hair et al., 2016). The findings of ethnography research tend to be both descriptive and interpretive (Gray, 2014).

This approach allows the researcher to gather detailed accounts about the social group that is being studied and experience it first-hand. Thus, allowing to better understand

the studied topic and provide more insights (Collis and Hussey, 2014). However, it could be hard to gain access to the research setting and to establish trust with participants (Collis and Hussey, 2014). It also could be challenging for the researcher to take part in the activities and conduct research at the same time. Furthermore, the research process usually takes a long time (Collis and Hussey, 2014).

Action research

Action research views that the most effective way of studying an organisation or a social system is by trying to influence it (Easterby-Smith et al., 2018). The aims of this type of research is to examine the environment and to find the means of implementing a change (Collis and Hussey, 2014). In business research action research focuses on the ways of delivering planned change in an organisation (Sekaran and Bougie, 2016). It tends to build on existing theory but also identify and study practical elements of the process (Gray, 2014).

Action research tends to be conducted in one organisation in a natural environment, which makes it similar to case study approach (Collis and Hussey, 2014). The research project starts by identifying the problem that needs to be addressed (Collis and Hussey, 2014). Afterwards, the researcher enters the environment and makes the identified changes (Collis and Hussey, 2014). Research then assesses the effectiveness of the change process, evaluates it and if required suggests further improvements. Thus, continuing on a cyclical basis until the change is implemented and the solution is found (Sekaran and Bougie, 2016). Due to this iterative nature, the research project tends to start with a specific research question but it may change in the process of research as the researcher observes and assesses the situation (Saunders, Lewis and Thornhill, 2016).

Researchers adopting action research tend to be more interpretivist, assuming that value-free knowledge is impossible (Gray, 2014). The investigator also believes that the social world is constantly changing (Collis and Hussey, 2014), with the researcher influencing this change (Easterby-Smith et al., 2018). The research is likely to have an inductive approach to theory development, although the projects tend to start with an identified problem that the research aims to resolve which is further clarified during the first stages of field work (Sekaran and Bougie, 2016). The project doesn't study one specific variable, instead it focuses on complex systems (Gray, 2014). The data is collected in a real environment and often requires creative data collection techniques (Sekaran and Bougie, 2016). It tends to incorporate different types of knowledge – abstract theoretical concepts and views of participants (Saunders, Lewis and Thornhill,

2016). The approach also relies on participative and collaborative approach between the researcher and other members of the environment (Saunders, Lewis and Thornhill, 2016).

Action research provides rich and detailed insights on how organisations and systems change, with the researcher having first-hand detailed experience of the implementation process (Saunders, Lewis and Thornhill, 2016). The organisation also benefits as the employees are more likely to implement the change they helped to identify and create (Saunders, Lewis and Thornhill, 2016). However, the research relies on the members of organisation cooperating with the researcher and the project often takes a long time to be completed (Saunders, Lewis and Thornhill, 2016).

Grounded theory

Grounded theory is an approach which involves data collection, coding and analysis in order to develop a theory describing a phenomenon (Collis and Hussey, 2014). It aims to analyse, interpret and explain how social actors create and interpret their experiences in certain situations (Saunders, Lewis and Thornhill, 2016). It is an opposite strategy to experiment – rather than collecting data to test a specific hypothesis, the researcher collects the data to develop a new theory (Collis and Hussey, 2014). Grounded theory is a commonly used strategy in business and management research (Easterby-Smith et al., 2018).

Generally, two approaches to grounded theory are advocated in the literature. Some authors believe that although researchers ought to have a competent level of knowledge in the field they are embarking to research, existing theory should not guide the way they code the data, add new cases or conduct the analysis (Saunders, Lewis and Thornhill, 2016). Instead, a more unstructured approach should be used and the researcher ought to examine the data to formulate the ideas about the theory (Easterby-Smith et al., 2018). In contrast, some authors advocate the need to be familiar with established theories and encourage the use of more structured ways of generating theory during data analysis (Gray, 2014). However, in both cases the researcher should start data collection with a specific purpose, which is most likely going to be modified during the research process (Gray, 2014).

The first group tends to use a more interpretivist research philosophy, while the second leans toward positivism (Easterby-Smith et al., 2018). Although some authors define grounded theory as using inductive approach to theory development (Easterby-Smith et al., 2018; Sekaran and Bougie, 2016), others categorise it as abductive as the researcher may start with no specific theory, formulating a more specific research

question during data collection and analysis and then tests it with subsequent participants (Saunders, Lewis and Thornhill, 2016). Grounded theory tends to work with qualitative data, which is often collected and analysed at the same time (Saunders, Lewis and Thornhill, 2016). The aim of the research outcome is to study a process in multiple settings and generate a theory that can be generalised to multiple settings (Easterby-Smith et al., 2018).

Grounded theory allows to generate new and innovative theories from qualitative data (Saunders, Lewis and Thornhill, 2016). However, it could be challenging for researchers to get access to the company or setting (Easterby-Smith et al., 2018). Even if permission is granted, the organisations often impose time limits on how much interaction the researcher may have with the employees, which topics are covered and how the data is used (Easterby-Smith et al., 2018). It also tends to be a time consuming and intensive strategy for the researcher (Saunders, Lewis and Thornhill, 2016).

Mixed methods

Mixed method strategy combines qualitative and quantitative strategies during data collection and analysis to address the research questions which cannot be answered with a single strategy (Sekaran and Bougie, 2016). The research approach tends to draw from both research philosophies – positivism and interpretivism (Easterby-Smith et al., 2018). In addition, it also is likely to use abductive approach to theory development (Sekaran and Bougie, 2016).

Research projects using mixed methods depend on sequencing, or the order in which quantitative and qualitative methods are used, and dominance, or to what extent one method is used more than another (Easterby-Smith et al., 2018). The researchers use qualitative method prior to quantitative in cases where little is known about the field or where more information is needed in order to define the questions further (Matthews and Ross, 2010). The reverse – quantitative method before qualitative – is used when the researcher aims to expand on the insights (Easterby-Smith et al., 2018). The investigators can also use both approaches at the same time in order to answer different parts of the research question (Matthews and Ross, 2010). The extent to which one method is used more than another establishes its dominance, thus the study can be predominantly qualitative, predominantly quantitative or balanced (Easterby-Smith et al., 2018). The researchers also use multiple data collection techniques to collect different data about the same phenomena and compare them in order to

measure the validity of the data (Matthews and Ross, 2010). A process which is referred to as triangulation.

By mixing different methods, it is possible to address some of the shortcomings of a single method, thus strengthening the findings (Collis and Hussey, 2014). However, some mixed methods research may become too complicated and time consuming (Collis and Hussey, 2014). It also could be challenging to combine different research philosophies and acquire skills to work with both quantitative and qualitative data (Easterby-Smith et al., 2018).

Research strategy of the current study

Experiment, survey, case study and mixed methods are the strategies that have been used to study visual attention. Collis and Hussey (2014) noted that the choice of research strategy should be governed by the research purpose. The purpose of the current research was to assess visual attention of shoppers in a novel environment and to test specific, directional hypothesis about the relationships between the variables as guided by the theory of visual attention. Therefore, experimental strategy was the most suitable strategy for the current study. However, the current project aimed to examine how familiarity with the venue and the goals consumers had influenced visual attention. Thus, it was not possible to randomly allocate consumers to groups, so they were instead split into groups based on their personal characteristics – how often they visited the venue and whether they had a purchase intention. These answers were based on their responses to a brief questionnaire. However, as the data were only used to allocate consumers to groups, this was not a mixed methods strategy. Thus, the quasi-experiment approach, a type of experimental approach, was the most appropriate research strategy to address the research questions of the current project. The quasi-experiment strategy is consistent with the internal realism ontology, positivist research philosophy, deductive approach to theory development and explanatory research purpose adopted by the current project.

3.2.4. DATA COLLECTION TECHNIQUES

The current section examines and evaluates the most common types of data collection techniques, such as questionnaires, interviews, focus groups and observations (Matthews and Ross, 2010), and concludes with the technique used in the current project.

Questionnaires

Questionnaires are an important method of data collection and are often used for descriptive and exploratory research (Saunders, Lewis and Thornhill, 2016). A questionnaire usually consists of a list of questions with a range of possible answers from which respondents can select. This technique is predominantly used to gather factual data such as age, gender and income, as well as opinions, attitudes, ideas and experiences (Matthews and Ross, 2010). It is an effective technique to use when the researcher aims to ask standardised questions that are likely to be interpreted in a similar manner by all respondents (Saunders, Lewis and Thornhill, 2016). The researcher can distribute a questionnaire in a number of ways – it can be filled in during an interaction with a researcher, given in person or sent via a Web link, post or email (Collis and Hussey, 2014). Research projects using questionnaires tend to compare respondent characteristics between groups or over time, or examine the relationships between questions (Matthews and Ross, 2010).

The major advantage of using questionnaires as a data collection tool is that it enables to economically collect structured data from a large number of respondents (Matthews and Ross, 2010). This technique also minimises the interviewer bias as the questions are usually read by the respondent and enables to provide anonymity to the respondents (Gray, 2014). Furthermore, the usage of closed questions enables to quickly analyse the data (Gray, 2014). However, the researcher needs to invest a lot of time to produce a good questionnaire as it is easy to ask the wrong questions and gather unreliable data (Matthews and Ross, 2010). Furthermore, the response rate tends to be low and respondents with low motivation can provide inaccurate, misleading answers which the researcher will not be able to identify (Saunders, Lewis and Thornhill, 2016).

Interviews

Interviews are a form of interactive communication between a researcher who asks questions and a participant who provides answers (Matthews and Ross, 2010). Interviews could be used to gather insights about participant attitudes, beliefs, behaviours and experiences (Gray, 2014). It is a useful data technique for collecting data on complex or sensitive issues, often by asking open-ended questions (Hair et al., 2016). Interviews can range from being highly structured to being highly unstructured and from being standardised to unstandardised (Hair et al., 2016). In a structured interview, the researcher asks predetermined questions in a specific order. The interview essentially utilises a questionnaire but delivered in an interview format

(Matthews and Ross, 2010). Whereas during unstructured interviews the researcher engages the respondents and encourages them to talk on the topic of interest without following a predetermined structure (Collis and Hussey, 2014). In semi-structured interviews the researcher prepares some specific questions in advance, but allows the interviewee to develop some topics further (Saunders, Lewis and Thornhill, 2016). Standardised interviews use the same questions structure for every participant, while in unstandardised interviews the questions may vary between participants (Matthews and Ross, 2010). Due to various types of interviews, they can be used during exploratory, descriptive, explanatory and evaluative research projects (Saunders, Lewis and Thornhill, 2016). They can be conducted face to face, online and by telephone (Collis and Hussey, 2014).

The advantage of an interview is that by having a contact with the researcher, participants are more likely to talk about sensitive or confidential issues (Saunders, Lewis and Thornhill, 2016). They may also provide more details during a conversation, rather than when asked to write it down (Gray, 2014). Participants also have a chance to clarify the questions or meanings, which could lead to more accurate data (Gray, 2014). However, the way in which questions are posed or the manner in which the researcher behaves can influence the responses (Saunders, Lewis and Thornhill, 2016). Additionally, although face-to-face contact may encourage some participants to talk, others may not be comfortable sharing some confidential information or could share just positive details thus creating response bias (Saunders, Lewis and Thornhill, 2016). Furthermore, conducting interviews could be challenging, as the researcher needs to pose questions, listen to the responses and ask further questions, while making notes about answers and participant's non-verbal behaviour (Gray, 2014). Some types of interviews are also very time consuming to analyse (Collis and Hussey, 2014).

Focus groups

Focus groups are discussions between a researcher and a group or respondents sharing a common characteristic or experience relevant to the research (Matthews and Ross, 2010). Focus groups tend to contain between four and twelve respondents, although the group size varies depending on the type of participants, research question and researcher skills (Saunders, Lewis and Thornhill, 2016). Data collection tends to be relatively unstructured – the researcher knows general direction of the discussion but some questions may be removed or added during the discussion between participants and researcher (Hair et al., 2016). Focus groups share many

characteristics with semi-structured interviews, hence some researchers characterise it as a form of an interview (Matthews and Ross, 2010). This form of data collection is used to gather deep, rich qualitative data about people's feelings, reactions and opinions (Collis and Hussey, 2014). It tends to be used in exploratory research to develop new knowledge about a phenomenon (Hair et al., 2016).

Focus groups tend to provide similar advantages and disadvantages as interviews. Although it is a relatively low cost technique for collecting detailed data (Gray, 2014), it could be challenging to gather participants together at the same time and place (Matthews and Ross, 2010). The researcher also needs to ensure that participants are enthusiastic and cooperative in order to obtain insightful data (Gray, 2014).

Observation

Observation involves systematic viewing, recording, description, analysis and interpretation of participant's behaviour (Saunders, Lewis and Thornhill, 2016). Compared to other data collection techniques, observation has been a much less used method in business research (Saunders, Lewis and Thornhill, 2016). However, its use has risen recently, likely due to technological advancements (Saunders, Lewis and Thornhill, 2016). Observations are a good way to study actions and behaviour, but not cognitive thoughts and attitudes (Sekaran and Bougie, 2016). Observation research consists of two types – participant observation and non-participant observation (Saunders, Lewis and Thornhill, 2016). During participant observation, the researcher is fully involved in participant's social world and aims to undertake the same activities as participants, integrating into their workgroup, organisation or community (Saunders, Lewis and Thornhill, 2016). Participant observation technique allows the researcher to better understand the environment in which respondents operate and their perceptions and views on the studied phenomenon (Saunders, Lewis and Thornhill, 2016). It helps to uncover values, motives and practices of respondents (Collis and Hussey, 2014). Whereas during non-participant observation the researcher is detached from participants, observing their actions via a one-way mirror or a video recording (Sekaran and Bougie, 2016). By being detached from participants, it could be easier for the researcher to focus on analysing their actions and the researcher is less likely to influence participant's behaviour (Collis and Hussey, 2014). Both types of observations can be carried out in natural or artificial settings (Collis and Hussey, 2014).

Each type can be further split into structured and unstructured observation (Sekaran and Bougie, 2016). During structured observation, the researcher plans in advance activities to be undertaken and phenomena to be studied (Sekaran and Bougie, 2016).

The researcher aims to examine and quantify the behaviour of a single person, groups of people or the occurrence of specific events in the environment (Saunders, Lewis and Thornhill, 2016). Thus, structured observational studies often result in generation of quantitative data (Sekaran and Bougie, 2016). In contrast, unstructured observations are undertaken when the researcher has no specific ideas about the phenomena (Sekaran and Bougie, 2016). During the observation, researcher notes and describes all actions and behaviours of participants aiming to outline the phenomenon and generate more specific research questions for subsequent research (Sekaran and Bougie, 2016). Unstructured observations are used during exploratory research and tends to generate qualitative data (Sekaran and Bougie, 2016).

Major advantage of observational data collection is that the researcher observes actions and behaviours of respondents instead of relying on self-reported measurements (Gray, 2014). Respondents may not even be aware that they are undertaking certain behaviour, thus not reporting them and potentially biasing self-reported results (Gray, 2014). However, while respondents' actions are observed, it may be hard to assess their thoughts and attitudes (Hair et al., 2016). Participants' behaviour could also be influenced by the knowledge that they are being observed (Sekaran and Bougie, 2016). Observational research may take long to undertake, it could pose a range of ethical challenges and it could be hard to get access to natural settings (Collis and Hussey, 2014). Furthermore, data interpretation could be hard and the researcher needs to consider research biases during data analysis (Gray, 2014).

Data collection technique of the current project

Different aspects of visual attention could be studied using all of the aforementioned techniques. However, the aim of the current research project was to quantify and examine visual attention in a novel retail environment. More specifically, the study investigated how consumer familiarity and goals influenced visual attention and assessed the relationship between visual attention and choice during their shopping journey. The adoption of internal realism ontology and positivist epistemology calls for a more objective measurements of concepts. Therefore, the study used the eye-tracking method of recording visual attention. Eye-tracking equipment enabled to unobtrusively record eye movements of participants, thus quantifying their visual attention and collecting data that enabled to answer the research questions. This method observed visual behaviour of participants, without the need for a researcher to physically be present during their shopping process. Therefore, the current study used structured non-participant observation data collection technique. This approach is

consistent with the philosophical stance of the current project, as well as with the explanatory research design purpose and quantitative research method.

3.2.5. RESEARCH LOCATION

There are two main locations for the research projects – laboratory or artificial location and natural, “real” or field-based location. The definitions are quite straightforward. Laboratory locations refers to a simulated setting in which the researcher is able to control the environment, in order to study specific variables and to control for other extraneous variables (Collis and Hussey, 2014). The studies conducted in artificial locations tend to aim to find causal relationships between the variables (Sekaran and Bougie, 2016). Whereas the research carried out in a laboratory leads to more robust findings, the external validity of findings, or the ability to generalise the results to other settings, is limited (Bryman and Bell, 2015). This research setting is commonly used in research adopting positivist epistemology and realist ontology (Collis and Hussey, 2014).

In contrast, research carried out in a field location is conducted in the actual environment that is being researched, such as a workplace, an educational establishment or a shopping venue (Bryman and Bell, 2015). This research location makes it harder for the researchers to control a plethora of other variables, such as temperature, other people, lighting, etc., all of which could have an influence on a studied variable (Collis and Hussey, 2014). Yet, the results provide a better external validity and allow to examine more natural behaviour of respondents (Bryman and Bell, 2015). Studies carried out in a real environment tend to use nominalism ontology and interpretivism epistemology (Collis and Hussey, 2014).

Research location of the current study

Carrying out data collection in a natural, or real-life setting was an integral feature of the current study. The aim of the current project was to investigate visual attention of shoppers in a novel, real-life shopping environment to address the gap in the literature. The specific research questions set out to investigate the influence of venue familiarity and shopping goals on visual attention of shoppers, and to examine the link between visual attention and choice.

Although laboratory-based setting is more congruent with internal realism ontology, positivist epistemology, qualitative research method and experiment research strategy adopted by the current project (Collis and Hussey, 2014), this research setting will not enable to achieve the goal of the current project to examine visual attention in a real

shopping environment. The project set out to test elements laboratory-based visual attention theory in a real environment, in order to investigate whether the findings could be generalised to a novel and complex environment. Thus, the current project was conducted in a real-life shopping environment in a pub.

3.2.6. SAMPLING

Sampling refers to drawing a small subsection of a population in order to study its characteristics (Hair et al., 2016). Population refers to all elements that share a common characteristics (Hair et al., 2016). Sampling is used when the researcher aims to learn something about a large group by extrapolating from a smaller group (Easterby-Smith et al., 2018). In certain cases the researchers study all elements of the population – often when the population is not large – which is called a census (Saunders, Lewis and Thornhill, 2016). However, sampling is crucial if the population is large as otherwise the research would be costly and time-consuming (Hair et al., 2016). It was also argued that by focusing the resources and attention on studying a smaller subset of the population the researcher may acquire better quality data (Blumberg, Cooper and Schindler, 2014). Additionally, the researchers need to sample in cases where it is impractical to study the whole population (Saunders, Lewis and Thornhill, 2016). For example in cases where the research involves studying product quality of a sealed product and requires opening it for examination (Hair et al., 2016).

Probability sampling

Probability sampling is a sampling technique which is used when every case in the population has a known probability of being chosen for the sample (Sekaran and Bougie, 2016). To create a sample, each case is chosen at random which allows to minimise biases during the selection process (Matthews and Ross, 2010). As a result, the generated sample should be representative of the population (Matthews and Ross, 2010). Thus, allowing to examine a smaller group of respondents and generalise the findings to a larger group (Gray, 2014). This form of sampling tends to be used under a positivist philosophy and predominantly in quantitative research (Collis and Hussey, 2014). Four types of probability sampling are identified – simple random sampling, systematic random sampling, stratified sampling and cluster sampling (Gray, 2014).

For simple random sample, the researcher needs to have a list of the whole population from which a sample of cases is randomly drawn (Easterby-Smith et al., 2018). Each case on the list is assigned a number, the researcher then generates a required number of random values using a random number table or an electronic random

number generating tool and the matching cases are included in the sample (Gray, 2014). It is used when the researcher assumes that population is relatively homogeneous (Gray, 2014).

Systematic random sampling is similar to simple random sampling, however instead of randomly choosing cases from the list, the researcher picks them at a specific regular interval (Sekaran and Bougie, 2016). To begin the sampling process, the researcher identifies the first case to be included using a random number and then selects subsequent cases at a regular interval (Saunders, Lewis and Thornhill, 2016).

Stratified random sampling involves splitting the population into homogeneous groups called strata and then randomly sampling respondents from each group in order to generate a more representative sample (Hair et al., 2016). This approach is used instead of simple random sample in the cases where the population is not homogenous and there is a chance that a random approach would not generate a representative sample (Easterby-Smith et al., 2018).

Cluster sampling starts by splitting the population into a number of groups or “clusters”, randomly selects a sample of clusters which are then included in the study (Blumberg, Cooper and Schindler, 2014). This approach allows to address the cost implications of other types of probability sampling as the sampled cases could be geographically spread resulting in a high cost and increased time scale of the research (Easterby-Smith et al., 2018).

Non-probability sampling

In contrast to probability sampling, the cases in population of the non-probability sample do not have a known probability of being chosen (Blumberg, Cooper and Schindler, 2014). As a result, the results cannot be directly generalised from sample to the population (Sekaran and Bougie, 2016). Non-probability sampling tends to be used with interpretivist research philosophy as the aim is to describe the environment rather than generalise the results to the overall population (Collis and Hussey, 2014).

Common types of non-probability sampling are – convenience sampling, quota sampling, purposive sampling and snowball sampling.

Convenience sampling involves selecting the cases which are easily available to take part in the study (Easterby-Smith et al., 2018). This approach enables the researcher to efficiently gather large amount of data and pilot test projects (Sekaran and Bougie, 2016). However, it could suffer from selection bias thus not allowing to generalise the results (Hair et al., 2016).

Quota sampling approach splits a population into separate groups and adds cases from each group until a predefined quota is fulfilled (Gray, 2014). Hence, creating a sample which has the same composition as a population (Easterby-Smith et al., 2018). Quota sampling allows to gather data quickly and from a more varied range of participants than convenience sampling, hence minimising some of the researcher-specific biases (Saunders, Lewis and Thornhill, 2016).

In purposive sampling the researchers select cases due to their usefulness to the research project (Saunders, Lewis and Thornhill, 2016). Thus, the researcher makes a call about who will contribute to the research project. One of the disadvantages is that the researcher may exclude some of the relevant respondents or make some unconscious biases during selection (Gray, 2014).

Snowball sampling involves initially recruiting a small group of participants from the population who are relevant to the research project and then asking them to suggest further respondents (Bryman and Bell, 2015). This method is useful when there is no information about the population or when the potential participants are hard to reach (Matthews and Ross, 2010).

Sampling of the current project

According to the chosen stances of the current project – internal realism ontology, positivism epistemology, qualitative research method and experiment research – probability sampling would be the most appropriate way of generating a sample (Saunders, Lewis and Thornhill, 2016).

However, within this project it would be time consuming, expensive and therefore not feasible to obtain a list of all pub goers from which a sample could be drawn. Thus, not allowing to use a probability sampling method. Additionally, the first research question of the current project was to examine how venue familiarity influenced visual attention. Arguably, it is may not even be possible to obtain a population of visitors that are planning to visit a specific pub for the first time, as these decisions are often made because the visitors happen to walk down a street and see a venue. Therefore, the current project used a convenience sample of people with reported intention to purchase beer intercepted on their entry to a pub. As the current project aimed to study visual attention of consumers in a real pub environment, a group of people who opted to visit a venue are likely to be representative of pub goers. This approach is also consistent with the field-based research location of the current study. As selected sample featured individuals who decided themselves to undertake a shopping journey and the current project measured their actual visual behaviour, it is believed that the

biases associated with the convenience sample are reduced. Additionally, most published research examining the link between visual attention and familiarity, goals and decision-making in the real environment used convenience samples (such as Otterbring et al., 2014; Gidlöf et al., 2017).

3.3. DATA COLLECTION

The current section outlines the practical aspects of this project's data collection – its research location, participants, stimuli, equipment, measures and procedure. The aim of the current project was to investigate visual attention in a novel, real-life environment – a pub, a setting which is visited by 90% of adults in the UK (Mintel, 2019) and features a number of unique characteristics (see Table 1) compared to supermarket-like shopping environments that have received limited research focus. The study used beer pump clips as point of purchase stimuli as beer is the most prominent product category at the bar, which is present in a consistent manner in the pubs regardless of their design or layout. The following research hypotheses were identified as gaps in the literature, and were tested using the data collected in the current project:

H1a: Greater familiarity with the pub venue reduces visual attention to the in-store environment

H1b: Greater familiarity with the pub venue reduces visual attention to beer brands at the point of purchase

H2: A specific shopping goal reduces visual attention to beer brands at point of purchase

H3: Increased visual attention to a brand leads to an increased likelihood of it being chosen

Overall, a single experiment was carried out to gather data to test the hypotheses. Pub visitors were intercepted at venue entry and if they had an intention to purchase beer were asked to take part in the research. On agreement, they were asked to fill in a brief questionnaire to indicate their age, venue familiarity and brand intention. Afterwards, they were asked to undertake their planned shopping journey and purchase a beer while wearing the eye-tracking glasses. Afterwards, their actual purchase was recorded.

During the analysis, which is outlined in more detail in the last section, to test H1a, H1b and H2 participants were split into separate groups based on their self-reported answers to a brief questionnaire which measured their level of familiarity with the venue

and whether they had an intention to purchase a specific product. Thus adopting a quasi-experimental design with familiarity and intention as a between-subjects factor. This approach builds on methodologies employed by Otterbring et al. (2014) and Gidlöf et al. (2017) who studied familiarity and preferences in a real supermarket. To test H3, visual attention on chosen and non-chosen items was investigated, in order to measure the association between the variables.

The data used in the current project was collected as a part of a commercial project conducted on behalf of a major brewer in the UK. A number of pioneering (Treistman and Gregg, 1979) and large scale (Pieters and Wedel, 2004) studies using eye-tracking methodology in marketing were conducted using commercial data. High costs, challenges in accessing participants and settings, lengthy data collection and analysis pose challenges in using this methodology in an academic setting (Chandon et al., 2008; Huddleston et al., 2018). The commercial research questions differed from those of the current study and thus did not have an effect on the reported results. As it is common to use commercially collected data for academic purposes a few researchers such as Chandon et al. (2008) and Chandon et al. (2009) examined the validity of using commercial data in academic studies and demonstrated that the metrics used in commercial projects could be used to carry out academic research and to reach valid conclusions.

3.3.1. RESEARCH LOCATION

The data was collected in three different pubs in the United Kingdom. Two venues were located in London and one in Cambridge. The venues were chosen together with a commercial partner; the choice was predominantly driven by the ability to negotiate venue access. Yet the three chosen venues represented a typical pub setting. Data collection was limited to those days and hours dictated by venue management in order to avoid business distraction and avoid potential bias in data (for example, respondents waiting in a queue to get served when the venue is busy). As a result, data collection took place in non-peak hours, usually late afternoon to early evening.

Venue 1 – The Tram Depot

The Tram Depot is a pub located in central Cambridge with student, academic and professional customer base. It featured the most point of purchase advertising and represented the most traditional pub environment, as shown in the images in Figure 8.



Figure 8: The Tram Depot venue

It featured a long bar layout with the widest beer selection featuring 12 standalone founts and 6 hand pumps, as depicted in the figure below.

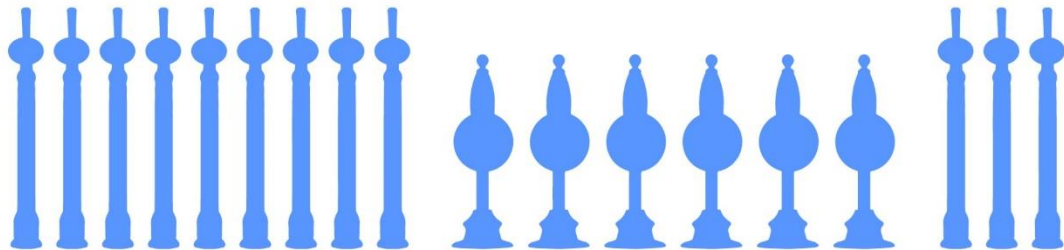


Figure 9: The Tram Depot – schematic view of the bar

Venue 2 – The Carpenters Arms

The Carpenters Arms is a venue located in London Fitzrovia. It also attracted student demographic, as well as academics and young professionals. The point of purchase is depicted in Figure 10.

This venue had the most compact bar layout, with most beers being part of a T-bar display with further two hand pumps, as shown in Figure 11.



Figure 10: The Carpenters Arms venue

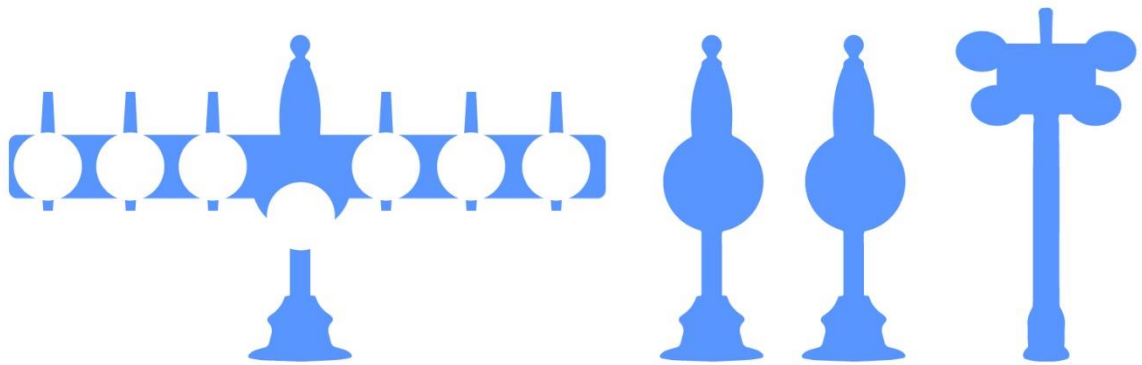


Figure 11: The Carpenters Arms – schematic view of the bar

Venue 3 – All Bar One

The All Bar One venue on New Oxford Street was used. This pub featured the most diverse demographics, being located in the centre of London. The image in Figure 12 showcases the pub interior.



Figure 12: All Bar One venue

It also featured a long bar display with 20 standalone founts arranged in two repeating sections. The arrangement is shown in the figure below.

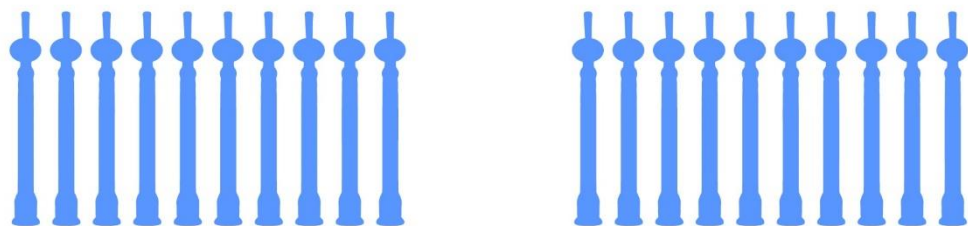


Figure 13: All Bar One – schematic view of the bard

3.3.2. PARTICIPANTS

A mall-intercept sampling method was adopted, which resulted in a non-probability convenience sample. Pub visitors entering the aforementioned venues were intercepted and asked to take part in the research if they intended to purchase beer. Overall, 178 people were recruited, 60 in The Tram Depot pub, 56 in The Carpenters Arms and 62 in All Bar One. Some individuals did not express desire to take part either due to time constraints or due to not wanting to wear the equipment, which was a similar observation to Harwood and Jones (2014). Visitors between 20-40 years old

were selected as it was the population of interest specified by the commercial partner and represents the population of 20-40 year olds visiting UK pubs across the UK.

The project was undertaken under the ethical guidelines of Anglia Ruskin University and with the approval from its ethics panel.

3.3.3. STIMULI

The data was collected in real-life environment, and as a result there were no manipulations to the product displays, which is consistent with the approach used by other researchers studying visual attention in a real environment (such as Clement, 2007; Gidlöf et al., 2017).

To assess visual attention, the studied scene was split into mutually exclusive areas of interest, within which visual attention was calculated. To address H1a and assess visual attention to the pub environment, the venues were split into the following areas of interest different in content and location:

- Back of bar – any beer related merchandise (posters, etc.)
- Back of bar – any menu boards
- Back of bar – all other elements of back of bar
- Fridges
- Bar top – glassware
- Bar top – bar towels
- Bar top – any personal items placed at bar top
- Bar top – any other elements of bar top
- Pump and fount clips
- People (other visitors)
- Bar staff
- Menus
- Other (remaining fixations that did not fit into the above groups)

Such division of an in-store environment has been previously used by Harwood and Jones (2014) who examined visual attention of shoppers in a department store. As the venues had different layouts and features, it was not possible to use a more structured approach and split areas shelf by shelf as for example was done by Wästlund et al. (2015).

To address hypotheses H1b through H3 and measure visual attention to pump clips at the point of purchase at the bar, each fount and hand pump clip was defined as an

area of interest. The most AOIs were in All Bar One – 20, while the fewest in The Carpenters Arms 13 (as shown in Table 8). As some pump clips were repeated at the point of purchase, Table 8 notes how many unique brands were present at the bar. In this case, The Tram Depot had the most – 14 – whereas All Bar One – the fewest with 10.

| Pub | Pump Clips (AOIs) | Brands (non-repeating) |
|---------------------|--------------------------|-------------------------------|
| The Tram Depot | 18 | 14 |
| The Carpenters Arms | 13 | 13 |
| All Bar One | 20 | 10 |

Table 8: The number of AOIs and brands at the bar

In the subsequent analysis, “visual attention to areas of interest” refers to the attention to all pump clips present at the point of purchase (e.g. 18 for The Tram Depot). However, “visual attention to brands” refers to non-repeating items at the bar (e.g. 14 for The Tram Depot).

3.3.4. EQUIPMENT

As the data collection was carried out in a real environment, wearable eye-tracking equipment was used to record visual attention of consumers while they navigated the pub and made a choice at the point of purchase. The head mounted eye-tracker Tobii Glasses 2 was used to record the eye gaze of participants. The eye-tracker consists of two main elements – the lightweight (45 grams), unobtrusive and non-invasive head unit, shaped as regular glasses, and a recording unit connected via a cable to the glasses, which controls and powers the eye-tracker, and stores the data on an SD card (see Figure 14).



Figure 14: Eye-tracking glasses (Tobii AB, 2018, p.1)

The glasses are equipped with infrared light emitters and four cameras recording participant's eyes which generate eye movement data. The data is subsequently combined with a video recording from a scene camera that records the view in front of the participant. The glasses make a binocular eye movement recording at a sampling frequency of 50Hz using a dark pupil and corneal reflection eye-tracking technique, covering the range of 82 degrees horizontally and 52 degrees vertically (Tobii AB, 2018). To provide accurate measures of visual attention, the glasses require a one point calibration to gather data on individual differences in a participant's eyes to subsequently use to estimate their eye movements.

The resulting data from the eye-tracking glasses at the end of each shopping journey was a video recording from a scene camera with their fixations superimposed on it. The researcher then classified the fixations into specific AOIs, as discussed in more detail in the Data Analysis section.

3.3.5. MEASURES

To test the hypotheses, two independent – familiarity and goal – and four measures of dependant variable (visual attention) were chosen – percentage of AOIs seen, total fixation duration, visit count and first fixation on final choice.

3.3.5.1. *FAMILIARITY*

In a brief questionnaire, participants were asked to indicate “How often do you visit this venue?” with possible answers:

- Twice a week or more
- About once a week
- About once a fortnight
- About once a month
- Less than once a month
- This is my first time

The scale was slightly adopted from that used by Mintel (2019) – a large commercial market research company – to study pub visiting behaviour. Prior academic research has also used the number of prior supermarket visits as a measure of familiarity (Gidlöf et al., 2017).

It is assumed that more visits to a venue lead to a better familiarity with it, just as purchasing a product more often leads to a better familiarity with it (Russo and Leclerc, 1994). Based on their answers to the questionnaire, during the analysis respondents

were split into three groups – regular visitors (those visiting a pub once a week or more), occasional visitors (those visiting less than once a week) and first time visitors.

3.3.5.2. *GOAL*

To measure the goal of participants, they were asked, “Please enter the brand you are planning to buy today or leave blank if undecided”. Based on the answers, during the analysis two groups were created – participants with a specific goal to purchase a predefined product, and participants with no specific brand in mind – hence those with an ambiguous goal.

3.3.5.3. *PERCENTAGE OF AOIs SEEN*

Percentage of AOIs seen is calculated by measuring the number of areas of interest noticed by a participant divided by the total number of AOIs. The metric enables to assess the spread of visual attention and to directly compare venues with different numbers of pump clips. It was used to test both visual attention to in-store environment and products. Previous researchers such as Russo and Leclerc (1994) used this metric to measure the spread of visual attention.

3.3.5.4. *TOTAL FIXATION DURATION*

Total fixation duration is the total duration in seconds of all fixations a participant made within each area of interest. This metric was used to assess the amount of attention directed to each product at the bar. As some beers had multiple pump clips present on the bar (predominantly on opposite ends of the bar), this metric calculated total visual attention to brands rather than pump clips. For example, if two Heineken pump clips were present at the bar, and a participant looked at each pump clip for two seconds, the total fixation duration for this participant for Heineken was four seconds. Although there was no time limit during which the participants had to perform a task, the study was conducted in a natural environment where respondents were asked to undertake their planned purchase. Therefore, it is assumed that they looked at the pump clips at the bar while making a choice as they normally do. Total fixation duration is a routinely collected metric in commercial projects (Chandon et al., 2008).

3.3.5.5. *VISIT COUNT*

Visit count measures how many times participants look at the area of interest during a purchase task. A single visit is recorded every time a respondent makes at least one fixation on an area of interest; subsequent visit is counted when a participant makes at least one fixation on any other part of the scene and then returns their attention to the

original area of interest. During the analysis, a median number of visits of noted areas was counted per participant. Holmqvist et al. (2011) noted that visit count can be used to assess how informative an area is. This metric was used to test H1a as large differences in the size of areas of interest makes metrics such as total fixation duration biased – larger areas are likely to get more visual attention due to their size. As real environment is used, it is also hard to assess the size of individual areas thus not making it possible to control for area size. Visit count metric enables to see whether some participants note more elements of the environment and whether they tend to re-examine them. This metric was used by Wästlund et al. (2015) to measure the spread of visual attention around the store. The metric was also used to test H3 to examine whether visual attention of shoppers to the chosen product differs from that to a non-chosen product.

3.3.5.6. *FIRST FIXATION ON FINAL CHOICE*

First fixation on final choice was used to measure how many fixations participants made on products before making a first fixation on a chosen product. It was calculated by listing all fixations made by each individual, comparing whether each fixation was on a chosen item and then calculating the number of fixations made by each individual until they looked at the chosen item for the first time. As the metric relates to products, it was not used when testing hypothesis relating to general pub environment. The metric enables to examine visual attention behaviour prior to looking at the chosen item and then compare it between groups. To test H3 the metric was slightly adopted to exclude repeating fixations on pump clips.

3.3.6. *PROCEDURE*

The process followed a standard research approach for collection of eye-tracking data in the real environment outlined by Hendrickson and Ailawadi (2014). The researcher was stationed either just outside of the venue or as close to the entrance as possible (depending on the venue design), intercepted customers at pub entry and informed visitors that they are conducting research in the current venue, followed by a screening question, “Are you planning to buy beer on this occasion?” On affirmative answer and confirmation of their age group, the visitors were informed they will need to fill in a questionnaire and wear a pair of eye-tracking glasses while making their intended purchase, followed by another brief questionnaire after their purchase. They were notified they will be rewarded with £5 for approximately 10 minutes of their time. The duration of test varied as a factor of venue and staff busyness and customer decision time.

Participants were provided with an information sheet and consent form to be completed followed by an entry questionnaire where they noted their demographic information, pub visiting behaviour (i.e. how often they visit the current venue) followed by a statement of today's purchase brand intention. During this stage participants were encouraged to face away from the bar to minimise potential biases by placing the required paperwork in a manner that would require participants to face away from the bar.

Once completed, the participants were fitted with the eye-tracking glasses, which were then individually calibrated. They were asked to approach the bar and complete their purchase. Data recording begins upon commencement of the respondent's journey to the bar and ends when the respondent leaves the bar with the purchase complete. At this stage the glasses were removed and respondents were provided with a tablet to complete a post-purchase questionnaire to indicate their actual purchase. Upon completion, the respondents were thanked for their time and given a £5 note.

The questionnaire used for this study (Appendix 7.1.) is a subset of the questionnaire used for the commercial study. The complete questionnaire included multiple questions required by the commercial partner but as most of these were not relevant to the current study, they were excluded from the scope of this project. Only questions such as demographics (age and gender of participants), pub familiarity, purchase goal (purchase intention) and product choice were used in the current project to describe the sample and split respondent into groups. It is unlikely that excluded questions present in the questionnaire biased or influenced respondent's answers to the chosen questions.

As data was collected in a field setting, the researcher was accompanied by another person throughout the whole time.

3.4. RESEARCH DESIGN QUALITY

Philosophical assumptions and research designs adopted in a research process have associated strengths and weaknesses (Saunders, Lewis and Thornhill, 2016). The researchers aim to select the tools which generate the best fitting data to assess the research question (Collis and Hussey, 2014). The concepts such as validity and reliability enable to assess the quality of the chosen approach (Saunders, Lewis and Thornhill, 2016) and are examined in the current section.

3.4.1. VALIDITY

Validity evaluates whether the chosen research type measures what the researcher intends to measure (Gray, 2014). It also assesses whether the chosen methods can provide valid analysis and generalisation of data (Saunders, Lewis and Thornhill, 2016). The literature identifies multiple types of validity, which can be categorised into three broad groups – face validity, internal validity and external validity (Gray, 2014).

Face validity refers to whether the chosen measurement is actually measuring the intended phenomenon (Collis and Hussey, 2014). Although face validity could be a subjective concept, the researcher can undertake a pilot test to assess whether the methods are measuring the intended concept (Hair et al., 2016). Additionally, the researcher can also use published work and the views of other researchers to assess the quality of the used instruments (Gray, 2014).

Internal validity refers to the extent to which the results were observed due to genuine differences between the studied variables as opposed to other influences or biases (Easterby-Smith et al., 2018). Hence, internal validity is high when accurate causal inferences can be made between studied variables (Gray, 2014). Whereas external validity refers to whether the findings can be generalised to other settings (Easterby-Smith et al., 2018). Research setting limits the extent to which studies can be generalised (Gray, 2014). For example, findings obtained by studying a large company cannot necessarily be generalised to a small business (Easterby-Smith et al., 2018).

Internal and external validity can be depicted as being on opposite ends of a continuum (Sekaran and Bougie, 2016). Internal validity tends to be high for experiments as they are conducted in highly controlled artificial settings using randomly selected and assigned participants (Gray, 2014). However, the usage of artificial environment to obtain precise measurements results in low external validity and ability to generalise the results to other non-artificial settings. Whereas more interpretivist often qualitative studies tend to be conducted in a natural environment which enable to provide better generalisation to other similar real-life environment. However, they result in less control of confounding and extraneous variables, thus generating data with less internal validity (Collis and Hussey, 2014). These decisions tend to be guided by the purpose of the study. Researchers can put in place further checks to ensure more valid data. For example, with qualitative interviews, participants can be asked to review transcripts or coding approaches of researchers to assure that their views are accurately reflected in the data (Gray, 2014).

Validity of the current study

Face validity of the measures of the current project – visual attention, familiarity and goals is high. The research aimed to assess visual attention of shoppers in a real setting, specifically to investigate how venue familiarity and consumer goals influence visual attention, and how visual attention and choice are associated. Thus, accurately measuring visual attention is important for the current project. As it was noted in the previous section, visual attention was measured using the eye-tracking equipment. The biological structure of the human eye requires humans to move their eyes to enable its visual processing (Dogu and Erkip, 2000). Hence, recording of eye movements enables to record participant's visual attention. Furthermore, prior academic studies such as Treistman and Gregg (1979) and Chandon et al. (2008) demonstrated face validity of using eye-tracking to measure visual attention. Although it is possible that respondents change their behaviour when they know they are being observed, Hendrickson and Ailawadi (2014) demonstrated that the use of eye-tracking equipment does not influence the behaviour of respondents. In the post-purchase questionnaire respondents indicated that they forgot they were wearing the equipment (Hendrickson and Ailawadi, 2014). Furthermore, this method of assessing visual attention has been shown to have a less biased effect on other measures such as choice and brand recall (Higgins, Leinenger and Rayner, 2014).

Additionally, the research aimed to assess how familiarity with the venue influences visual attention of shoppers. The current project measured familiarity with the venue as the number of interactions consumers have had with the venue in a recent time. The measure is consistent with commercial (Mintel, 2019) and academic (Gidlöf et al., 2017) measures of venue familiarity. This approach also follows a basic definition of familiarity that assumes people become more familiar with stimuli or a setting as they encounter it more (Alba and Hutchinson, 1987). Therefore, the face validity of familiarity measure is high.

Furthermore, the study examined how consumer goal types influence visual attention of shoppers. The study assumed that consumers who know what exact product they want to purchase had a specific goal, whereas those who knew they wanted to purchase a beer but did not know which exact brand they wanted to purchase had an ambiguous goal. A similar approach was used by Wästlund et al. (2015), who identified consumers purchasing a specific jacket or coffee as being part of a specific goal group, whereas consumers purchasing the jacket or coffee they liked were assumed to have an ambiguous goal. This definition is consistent with the stance in the theory that

people with more defined goals have more specific goals than those with less defined goals (Russell et al., 1999).

The aim of the research was to investigate visual behaviour of respondents in a real-life shopping environment in a pub and generalise those findings to similar settings, as opposed to generalising findings from sample to population. Carrying out the experiment in a real location using consumers who planned to carry out the shopping task studied by the current project increased external validity of the project (Easterby-Smith et al., 2018). However, the usage of real-life research setting is associated with a lower internal validity as the researcher is not able to control potential confounding variables. The usage of quasi-research strategy also does not rely on random allocation of participants which could lead lower validity as the groups are not necessarily equivalent (Bryman and Bell, 2015). However, in some cases where randomisation is not possible quasi-experiment strategy can be used to reach strong inferences (Easterby-Smith et al., 2018). As current research aimed to examine how consumer familiarity and consumer goals influence visual attention, this approach should provide the most internally valid data. As actual visual behaviour of respondents is objectively recorded, it is believed that first time visitors in a studied pub are likely to exhibit similar behaviour to other first time visitors in other UK pubs thus providing reliable evidence to test the research hypothesis. By collecting data in multiple cities, the researcher aims to provide further support that the conclusions can be generalised to other venues.

3.4.2. RELIABILITY

Reliability assesses the extent to which the findings are replicable, consistent and bias-free (Sekaran and Bougie, 2016). Reliability is high when similar results are produced in a repeated study (Collis and Hussey, 2014). The concept of reliability is more important in positivist, quantitative studies than in interpretivist, qualitative ones (Bryman and Bell, 2015). Reliability is crucial as it allows to examine whether any systematic errors are present in the methods which could influence the results (Saunders, Lewis and Thornhill, 2016).

The elements of reliability are varied, however the definitions proposed by Bryman and Bell (2015) were chosen. The authors identified three elements that influence reliability – stability, internal reliability and inter-rater reliability. Stability refers to the researcher obtaining a similar set of results from a respondent on different occasions under similar conditions, using the same methods and techniques (Hair et al., 2016).

Thus, a positive correlation between the measures gathered on separate occasions indicates that reliability is high (Sekaran and Bougie, 2016).

Internal reliability aims to assess to what extent all items of a scale or measurement study the same concept (Howitt and Cramer, 2017). The concept is crucial for questionnaire data collection type and requires the researcher to assess whether multiple-indicator measures within the instrument are consistent using Cronbach's alpha test (Gray, 2014). A higher score implies a higher internal reliability.

Lastly, inter-rater reliability refers to how consistent and accurate are the judgements made by multiple people (Bryman and Bell, 2015). The measure refers to coding of observations, assigning scores to performance or categorising data which is performed by a number of coders. Inter-rater reliability is high when the scores of multiple individuals performing the coding are positively correlated (Gray, 2014).

Reliability of the current study

The research often requires its measurements to be stable. However, Howitt and Cramer (2017) noted that some psychological characteristics such as attention, happiness and alertness are not stable over time and could vary depending on the state of a person when they are taking part in the research. Therefore, the actual elements of the scene participants noticed in the current study could change if they were retested. However, the current project did not aim to find set patterns of visual behaviour. Instead, the aim was to compare the means between the groups of respondents – those with different levels of familiarity, goals or chosen and non-chosen products. Therefore, although the actual elements noticed in the scene could differ on repeated test, it is assumed that the volume of visual attention will remain the same. Such as regular visitors on average will look at the scene in a similar manner on a repeated test and pay less attention to the products, even though the actual products of the scene they notice could be different. Additionally, the study recruited a large sample of respondents, which enabled to average out more extreme cases. Therefore, resulting in high stability.

Internal reliability is a concept which is important to the research utilising questionnaires or some types of interview. This project gathered actual behaviour data, rather than relied on the responses of participants. Thus resulting in internal reliability measure being not applicable to the current project.

Finally, the collected eye-tracking data requires manual coding of fixations to identify which area of interest a participant looks at (further discussed in the following section).

Some research projects employ multiple researchers to undertake the task and then correlate the classification results to order to assess the extent to which the coders agree. However, it was not possible within the current project to have multiple coders, therefore all coding was conducted by the researcher. This could result in biases and low inter-rater reliability. In order to address this issue, a clear conservative rule was followed – a fixation was coded to the area of interest if it was overlaid by more than a half of a fixation. It should be noted that in most cases the coding was straightforward, but in borderline cases extra diligence was used. Additionally, all recordings were checked at least twice in order to correct any human error. Therefore, although only a single person coded the data, the adopted approach should result in high reliability of categorisation.

3.5. DATA ANALYSIS

Proprietary software Tobii Pro Lab (version 1.58.5884) licensed through Tobii Technology was used to process the raw eye-tracking data of 178 participants recorded in three UK pubs using Tobii Glasses 2 eye-tracking equipment. The raw data from the eye-tracking glasses was loaded into Tobii Pro Lab software that calculated and defined eye movements and overlaid them on the video recording of the scene camera. The default fixation algorithm – Tobii I-VT (Fixation) – was used to estimate eye movements (for further information about the filter see Olsen, 2012). The filter uses the velocity of the directional shifts of the eye to classify fixations and saccades. If eye gaze movement was less than 30°/s it was classified as a fixation. In case of data loss or gaps during the fixations of less than 75 milliseconds the fixation was filled-in as this is usually caused by temporary reflection or participants' blinking.

Once eye movements were identified, the process of fixation definition was undertaken. Although the whole customer journey was analysed – from the moment they started walking to the bar until they returned back to the researcher with a purchased product – the current study focused on the data from the point at which participants started their shopping journey until they made their choice. Journey start was defined as the moment just after the end of respondent's briefing when they began to perform their planned shopping task and started to walk towards the bar. Choice was defined as the moment participants pointed at the chosen beer or started to say its name to the bar staff.

To measure the location of each fixation, the researcher identified which area the fixation was on and mapped it to the relevant area on the screenshot. For example, Figure 15 shows a single fixation and where it was mapped. The researcher looked at

participant's gaze data on the left, identified that it was on a beer called Peroni, and mapped it to the area labelled Peroni on the screenshot on the right. Fixations were mapped using a conservative rule that a fixation on the border of an AOI was mapped to the area which more than a half of a circle overlaid. Each mapped fixation was checked at least twice to minimise mistakes and potential biases.

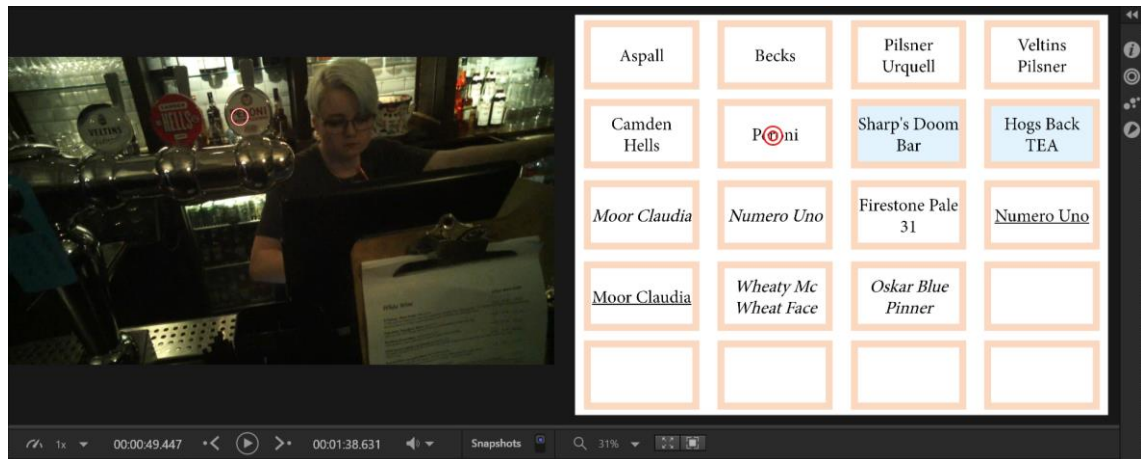


Figure 15: Defining fixations

To address the research hypotheses of the current project, two snapshots were used – one of the pub environment and another of the beers present at the bar (as was shown in Figure 15; see Stimuli for more details). Thus, the mapping procedure was performed twice for each respondent. The first time each fixation was mapped to the identified pub environment AOI (such as people, bar top, etc.). Hence, allowing to examine participant's general visual behaviour. Whereas the second time only fixations on beer pump clips were mapped to identify which specific brand they were looking at. Thus making it possible to examine their visual attention to specific products at the bar.

Once the locations of fixations within the areas of interest were defined, a range of metrics offered by Tobii Pro Lab were used to export summarised visual attention data for further analysis. AOI Time To First Fixation metric was exported to calculate the percentage of AOIs seen. AOI Total Fixation Duration metric was used for total fixation duration and AOI Visit Count (include zeros) metric was used to calculate visit count. The raw data export was used to manually calculate the first fixation on final choice metric as the software did not provide the means of doing it. The calculation of first fixation on final choice and all subsequent statistical analysis was performed in R version 3.3.1 on Windows 10 operating system.

3.5.1. RESULTS

Eye movement data of 178 respondents from journey start until choice resulted in 17,035 fixations, with an average of 95.7 fixations per person. The average time to choose a beer was 56.62 seconds, which is slightly higher than 44.8 seconds reported by Clement (2007) for participants making a choice in a supermarket aisle. The time difference could be explained by slightly different methodologies. Although Clement (2007) did not specifically state at which point they started the analysis, it is likely that the fact that participants in the current study needed to walk to the bar increased the average duration of their shopping journey, whereas the supermarket studies tended to start the analysis while participants are in a studied aisle. The difference in a shopping setting could have influenced the average time as well. Participants could have engaged with the bar staff to ask for advice or recommendation as the study was performed in a natural environment.

Out of 178 respondents, 140 were male (78.65%), 37 – female (20.79%) and one person who preferred not to answer the question (see Figure 16). The gender distribution resembles that of a beer market where male drinkers outnumber female drinkers (Mintel, 2019). The gender split varied between the venues, as is shown in Figure 17. The highest proportion of females was in The Tram Depot pub accounting for almost a third of respondents (32%) and the lowest – in The Carpenters Arms with 14% of respondents.

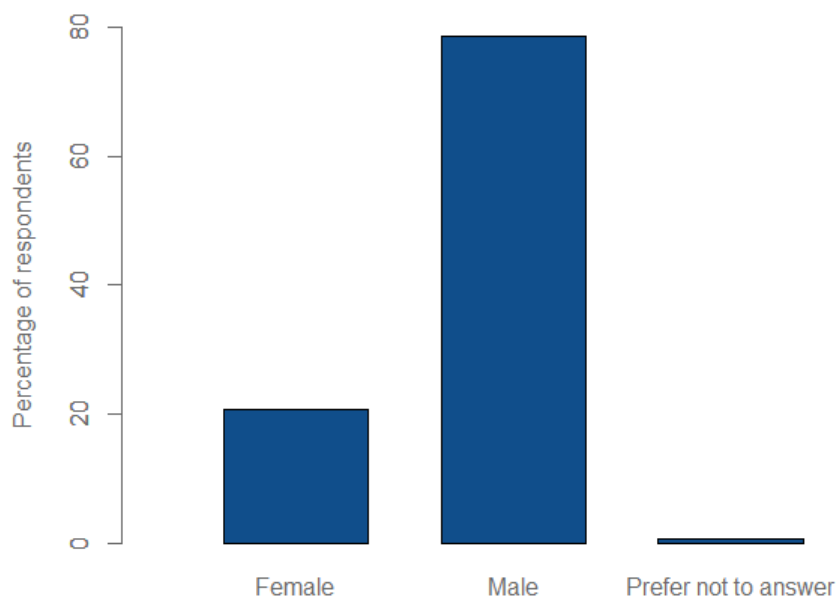


Figure 16: Gender of participants

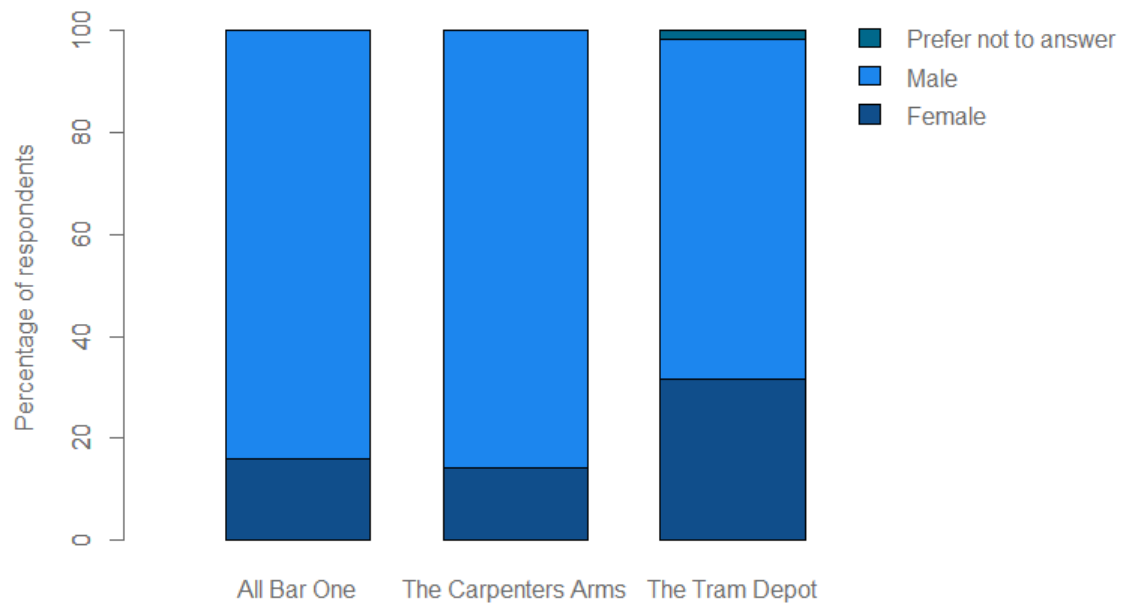


Figure 17: Gender composition between venues

As it was noted earlier, participants between 20 and 40 years-old were recruited to take part in the study. They were asked to report their age within the four age brackets shown in Figure 18. The distribution of participants was mostly uniform, with just over 20% in each group with an exception of 25-29 year-olds group that accounted for 33% of the sample.

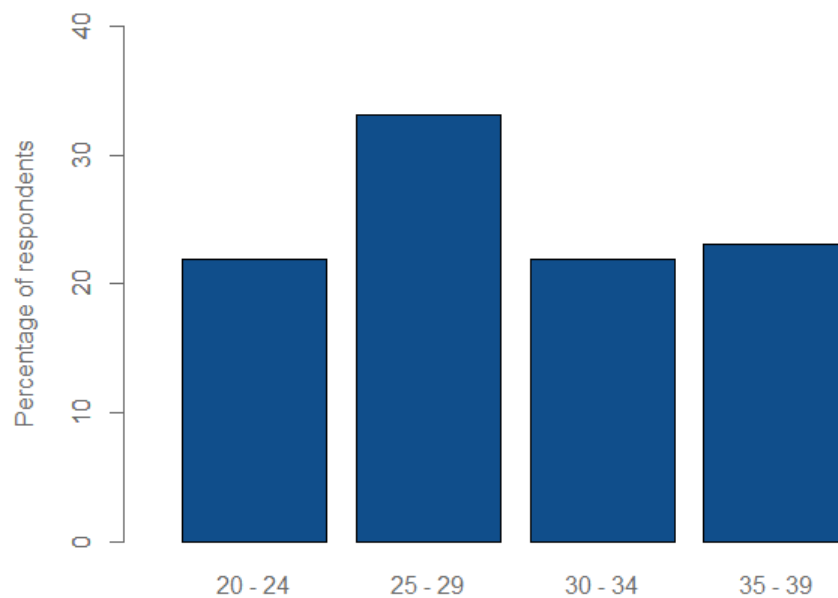


Figure 18: Participants age

The subsequent sections outline statistical techniques used to test each hypothesis. Full descriptive results and outputs of statistical tests are presented in section 7.2. Data analysis outputs from R per hypothesis in Appendix.

3.5.1.1. FAMILIARITY AND VISUAL ATTENTION

Participants were split into three groups based on how often they visit a pub in which data collection took place. As shown in Figure 19, the groups varied in size with the largest group (46%) visiting the venue occasionally and the smallest group (20%) visiting regularly. First time visitors accounted for 34% of participants.

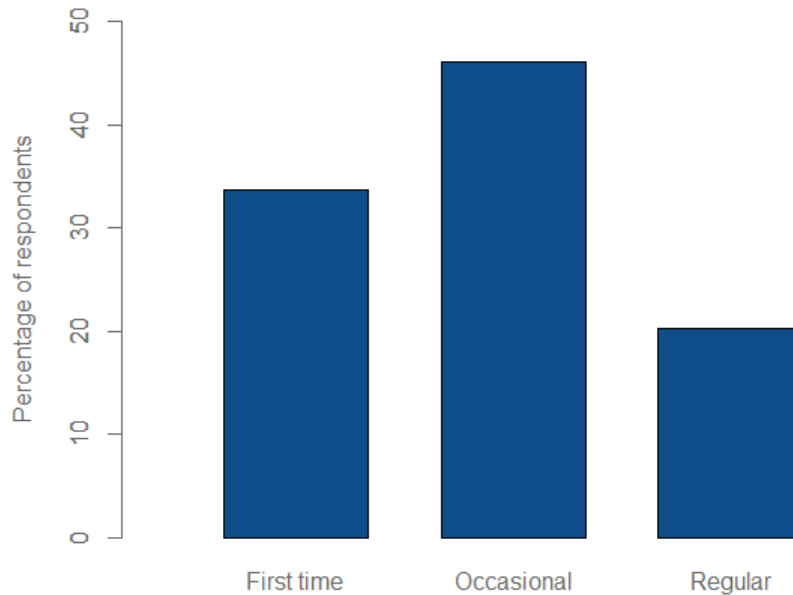


Figure 19: Frequency of venue visits

There was a slight difference in the composition of respondents between venues, as is presented in Figure 20. The number of occasional visitors is consistent across venues, representing just under a half of responds. Whereas the highest proportion of first timers – 42% – was in All Bar One, while the lowest – 23% – in The Tram Depot. This venue also has the highest proportion of regular visitors (30%) compared to All Bar One, which has the lowest at 13%. The difference is likely to be explained by varying pub locations. All Bar One is located in Central London potentially with a higher number of tourists, whereas The Tram Depot is located in Central Cambridge with customers comprising of students and local residents.

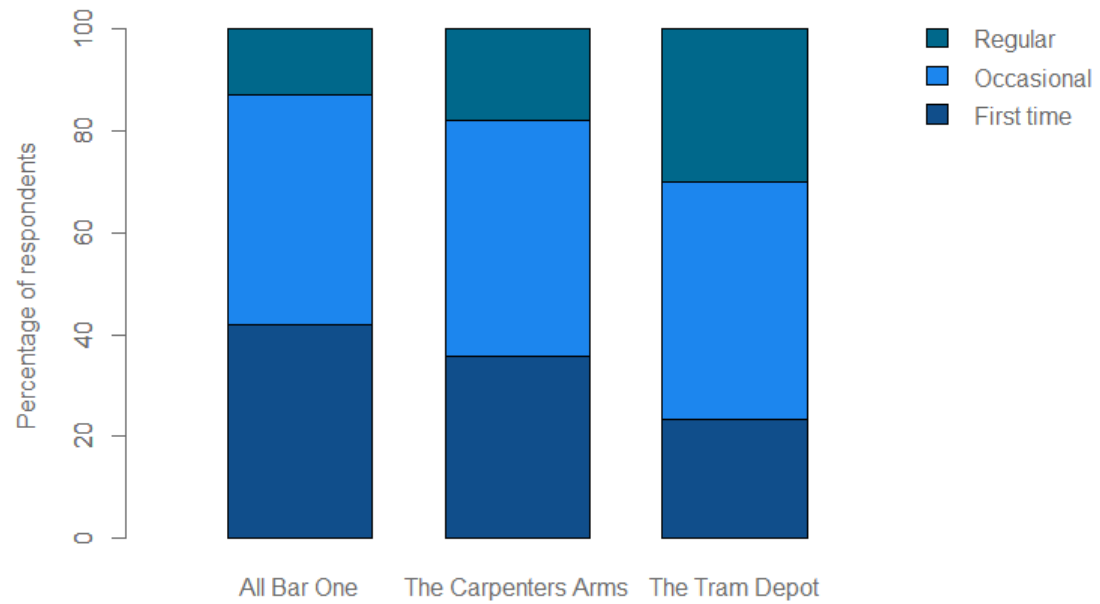


Figure 20: Frequency of venue visits between pubs

H1a: Greater familiarity with the pub venue reduces visual attention to the in-store environment

To test the relationship between pub familiarity and visual attention to the pub environment, visual attention was measured using two metrics – percentage of AOIs seen and visit count. The list of defined AOIs was outlined earlier in section Stimuli. During the analysis, two respondents were removed as they did not look at any areas of interest, which was likely caused by an error during the recording.

The aim of the current hypothesis is to compare whether there is a significant difference in the means of measures of visual attention to the general pub environment per three groups of consumers – first timers, occasionals and regulars. Independent variable (participant's familiarity) is a nominal variable, whereas dependent variable (multiple measures of visual attention) is a ratio variable as it has a true zero point (Gray, 2014). Zero seconds or zero visits means there was no visual attention. The most appropriate statistical test to examine the mean differences between one independent variable with three levels and a dependant variable measured on a ratio scale is a one way analysis of variance (ANOVA) (Sekaran and Bougie, 2016).

The results of ANOVA indicate whether the difference exists between at least one pair of studied groups, without indicating which exact groups were different. Therefore, where the main result of the ANOVA test was significant, a post-hoc Tukey's HSD (honestly significant difference) test was performed in order to assess which pairs of studied groups were statistically different (Sekaran and Bougie, 2016). The hypothesis was tested at 5% significance level.

Percentage of AOIs seen

On average, respondents noted just under a half of areas of interest or 47%. However, there does not appear to be a difference between the groups as all three groups noted approximately the same percentage of areas of interest: first timers – 46.7%, occasionals – 47.5% and regulars – 46.4%, as visualised in Figure 21. The variation between groups also appears to be consistent. The analysis of variance (ANOVA) showed that there is no difference between the percentage of AOIs noted by groups of participants with different levels of familiarity ($F(2, 173) = 0.07, p > 0.05$).

Hence, these results indicate that higher familiarity with a venue did not lead to noting significantly less areas of interest as it was hypothesised.

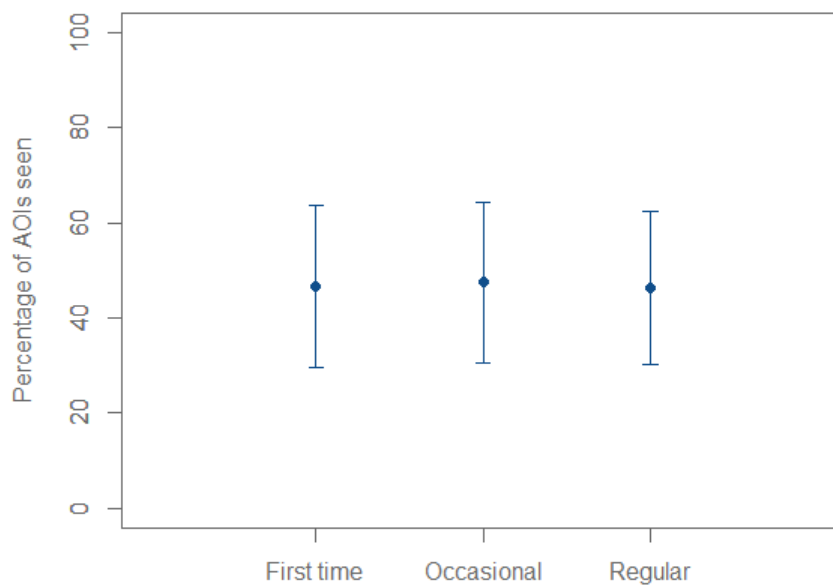


Figure 21: Percentage of AOIs seen – mean and standard deviation per group

Visit count

Another measure – visit count – showed that on average respondents made 4.7 visits per area of interest. On average, first timers made 41% more visits than regular visitors (5.63 vs 3.97). However, this group's visual behaviour is much more variable than that of other groups, with standard deviation of 6.60, as shown in Figure 22. This observation indicates that whereas some first time visitors looked between the studied areas quite a lot, others made very few visits. The least spread out results are for the regular consumers, indicating that compared to the other two groups the visual attention of consumers in this group is more homogeneous.

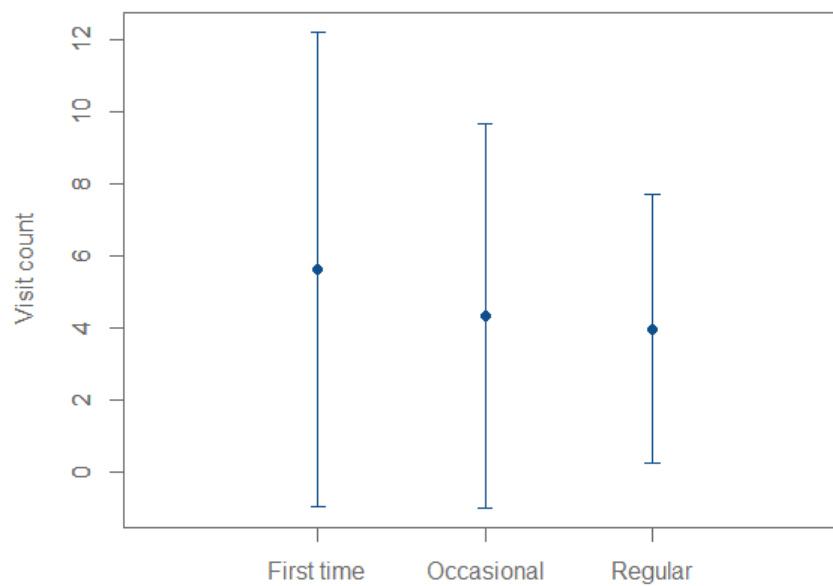


Figure 22: Visit count – mean and standard deviation per group

The results of ANOVA showed that there was no main effect of familiarity on visual attention as measured by visit count to in-store pub areas ($F(2, 173) = 1.33, p > 0.05$). This finding implies that although the differences in average visit count are in the hypothesised direction – first timers made the most visits, followed by occasionals and lastly by regulars, this difference was not statistically significant.

This finding shows that just as with percentage of AOIs noted, the level of familiarity did not influence visual attention of consumers to the general pub areas. Nonetheless, the differences between groups are more pronounced than with the percentage of AOIs noted.

Summary

The current hypothesis examined the relationship between consumers' pub familiarity and their visual attention to general pub areas. Visual attention was measured using two metrics – percentage of AOIs seen and visit count. The results of ANOVA showed that there was no significant differences between groups for both measures. Thus, failing to support the hypothesis that greater familiarity influences visual attention of consumers to the pub environment.

H1b: Greater familiarity with the pub venue reduces visual attention to beer brands at the point of purchase

To address the hypothesis, different aspects of visual attention were measured using three metrics – percentage of AOIs seen, total fixation duration and first fixation on final choice. Products were defined as all beers present at the bar during the time of data

collection. Nine respondents were removed from the analysis as they have not looked at any beers.

The aim of the current hypothesis is to compare whether there is a significant difference in the means of visual attention measures to beer pump clips per three groups of consumers – first timers, occasionals and regulars. As a result, the same assumptions as outlined in the previous section apply here and ANOVA test was used.

Percentage of AOs seen

On average, beer-intended consumers who entered a pub noticed 44% of pump clips present at the bar. Regular visitors noted 39% of the pump clips on offer, occasionals saw 42%, whereas first time visitors saw just over a half of beers (51%). Thus, regular visitors noted 24% fewer pump clips than respondents visiting the venue for the first time. This pattern is consistent with predicted relationships as greater familiarity with the venue seems to make consumers less visually inquisitive. The groups also had similar standard deviations, as visualised in Figure 23.

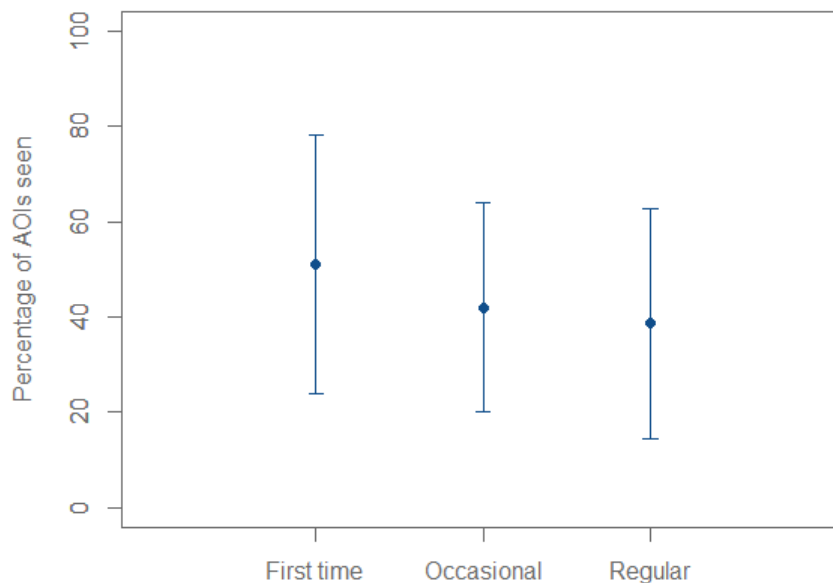


Figure 23: Percentage of AOs seen – mean and standard deviation per group

To test whether the observed differences between means are statistically significant, a one-way ANOVA test was conducted. The results showed that familiarity with a pub has a significant influence on visual attention to products at the bar ($F(2, 166) = 3.55$, $p < 0.05$). However, despite significant ANOVA result, a post-hoc test (Tukey's HSD at $p < 0.05$) showed no significant differences between groups. Although, the differences between first timers and regulars and first timers and occasionals approached significance at $p = 0.052$ and $p = 0.076$.

Thus, the results demonstrate the predicted relationship – higher familiarity with a shopping venue is linked to reduced visual attention. However none of the pairwise comparisons showed significant differences.

Total fixation duration

Participants spent on average 7.27 seconds looking at beer brands during a choice task. First time visitors spent on average twice as much time looking at beer brands at the point of purchase then regular visitors (10.11 seconds vs 5.13). Whereas occasional visitors spent slightly more time than regular visitors looking at brands (6.05 seconds). The differences are visualised in Figure 24. However, the first time visitors group was also much more varied than the other groups with a standard deviation of 10.38. This observation indicates that while some first time visitors paid very little attention to the brands on offers, others spent much more time studying them.

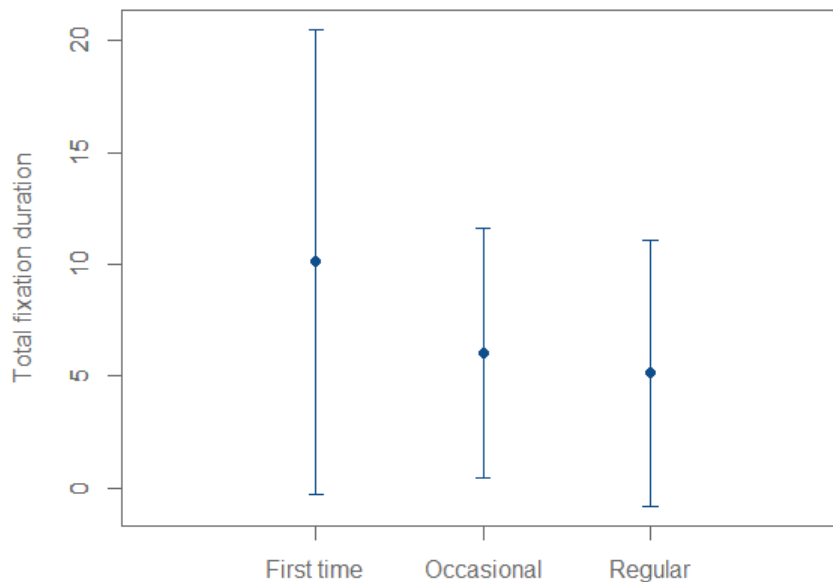


Figure 24: Total fixation duration – mean and standard deviation per group

An ANOVA test was conducted to assess the influence of venue familiarity on visual attention as measured by total fixation duration showing a significant main effect, $F(2, 166) = 6.3$, $p < 0.05$. To examine which groups significantly differed, a post-hoc Tukey HSD test was conducted. The results showed that the differences between first timers and regulars and first timers and occasionals are statistically significant at 5% significance level. No difference was noted in visual behaviour between occasional and regular participants.

These findings provide further evidence that greater familiarity is associated with lower visual attention. The most prominent differences were observed between first time and occasional and first time and regular groups of visitors.

First fixation on final choice

To examine the influence of venue familiarity on visual attention prior to noting a chosen item, an ANOVA test was conducted. Further 22 individuals were removed as their final choice was a beer which was not present at the bar (i.e. a bottle in a fridge), an area which was not defined as an AOI in the current project.

On average first timers made 37% more fixations than regulars before making a fixation on the beer they chose (6.09 vs 4.42). Surprisingly, occasional visitors made the most fixations – 6.46 – marginally higher than first timers. However, the data was quite variable, as shown in Figure 25. The results of ANOVA demonstrated that venue familiarity did not influence the number of fixations consumer made before noting a chosen item, $F(2, 153) = 0.87, p > 0.05$.

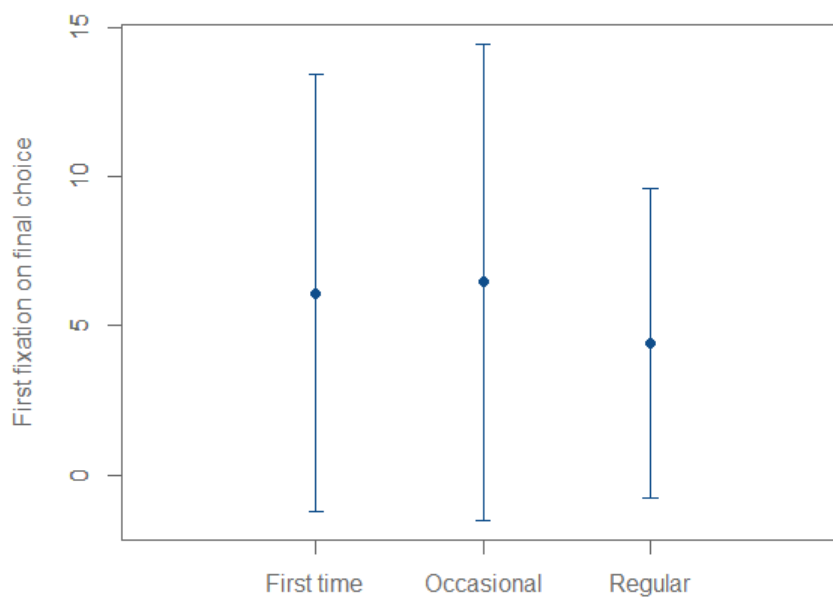


Figure 25: First fixation on final choice – mean and standard deviation per group

Therefore, the findings suggest that familiarity with the venue does not reduce the amount of visual attention as measured by the number of fixations before consumers note the eventually chosen product.

Total fixation duration on chosen product

Lastly, a version of total fixation duration metric was used to examine how much time consumers in different familiarity groups look at the chosen item. As predicted, the first

time visitors spent on average 2.59 seconds looking at the chosen item before placing an order, 135% more than regulars (1.12 seconds). As with previous metrics, occasional visitors spent 1.71 seconds – more than regular but less than first time visitors. As in the previous instances, visual attention of the first time visitors is more spread out compared to the other groups, as shown in Figure 26.

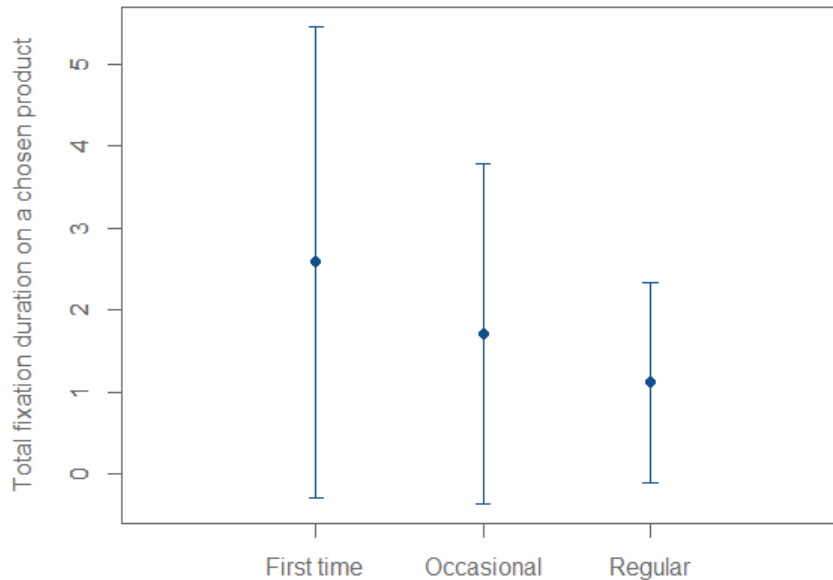


Figure 26: Total fixation duration on a chosen product – mean and standard deviation per group

The results of ANOVA demonstrated that familiarity did influence total fixation duration to the chosen item, $F(2, 153)$, $p < 0.05$. A post-hoc Tukey HSD test showed that the difference between first time and regular visitors was significant at 5% significance level. The differences between other groups were not statistically significant, although the p value for first time and regular visitors approached significance at $p = 0.08$.

This finding suggests that group familiarity influences the duration of consumer's visual attention to the chosen product. More specifically, first time visitors look at the chosen product significantly longer than the regular visitors.

Summary

The current hypothesis aimed to examine the influence of familiarity with a venue on consumer's visual attention to the products at the bar. The results demonstrated that lower familiarity was associated with significantly more visual attention as measured by the percentage of AOIs seen, total fixation duration and total fixation duration to the chosen item. However, no difference was observed using first fixation on final choice metric. These results partially support the hypothesis, demonstrating that greater

familiarity reduces visual attention to the products at the bar. Yet, it does not influence the number of fixations it takes to notice the chosen item.

3.5.1.2. GOALS AND VISUAL ATTENTION

Based on participants' answers in the pre-shopping task questionnaire, they were split into two groups – those with a specific goal (having an intention to purchase a specific brand) and those with an ambiguous goal (having an intention to purchase beer, but not a specific brand). The groups were almost equal with 94 respondents in an ambiguous goal and 84 in a specific goal group, as shown in the figure below.

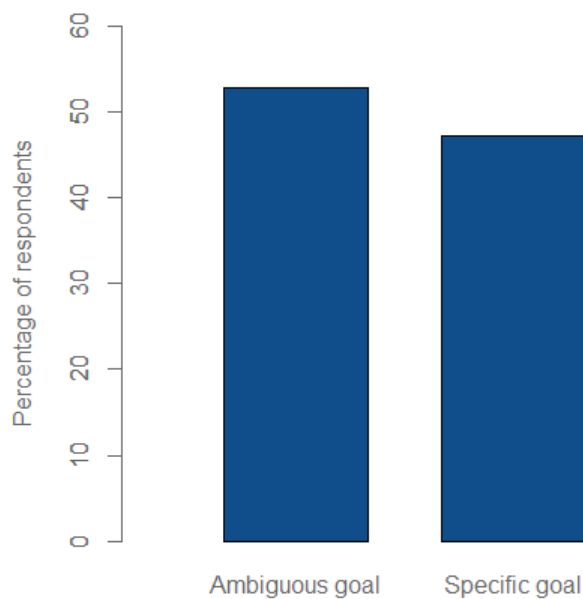


Figure 27: Frequency of consumers with specific vs ambiguous goal

The split is also relatively uniform between venues (see Figure 28). The Carpenters Arms had the largest difference between the groups with 41% of respondents having a specific goal and 59% having an ambiguous goal. All Bar One had 55% of visitors with a specific goal and 45% with an ambiguous, whereas The Tram Depot showed a reverse pattern with 45% of respondents having a specific goal and 55% having an ambiguous goal.

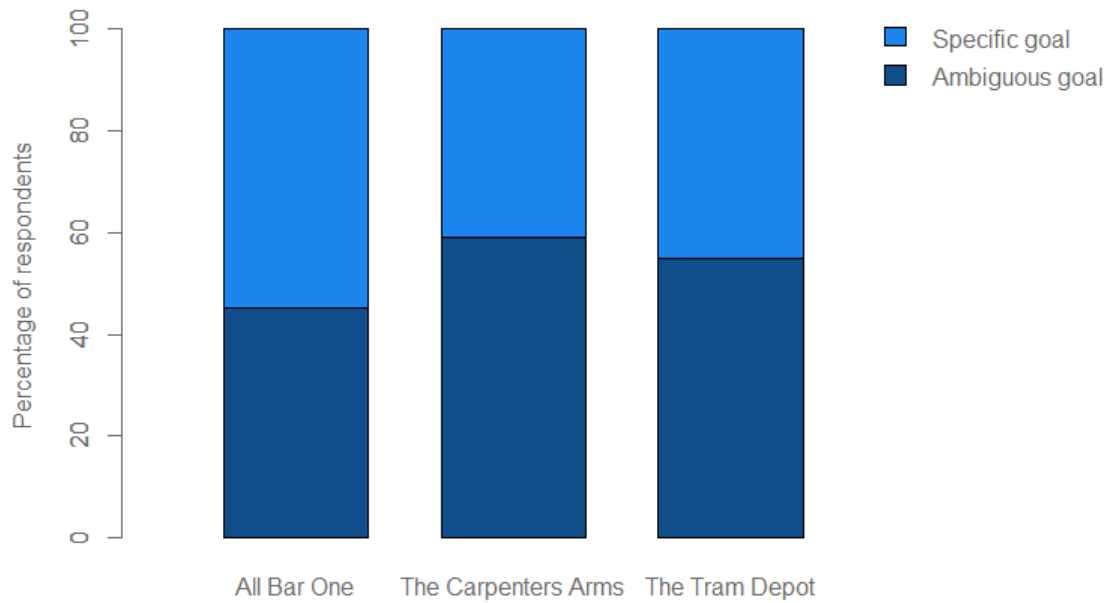


Figure 28: The distribution of specific vs ambiguous goals between venues

H2: A specific shopping goal reduces visual attention to beer brands at point of purchase

To examine the relationship between goal specificity and visual attention a range of statistical tests were performed. Visual attention was measured using three different metrics – percentage of AOs seen, total fixation duration and fixation on final choice – to assess its different elements. During the statistical analysis, nine respondents were removed due to their failure to look at any of the pump clips at the bar.

The aim of the current hypothesis was to examine whether a significant difference exists between the mean visual attention to products at the point of purchase of consumers with a specific and with an ambiguous goal. As visual attention is measured on a ratio scale and two groups (specific vs ambiguous goals) are independent, independent samples t-test is the most appropriate test to assess the differences between the means (Hair et al., 2016). Welch's t-test was used, assuming unequal variances of groups. The hypothesis was tested at 5% significance level.

Percentage of AOs seen

On average consumers with a specific goal looked at 38% of pump clips at the bar, 24% fewer than those with an ambiguous goal, who on average looked at 50% of pump clips on offer. The standard deviation of group with an ambiguous goal was slightly higher than those with a specific goal, as visualised in Figure 29.

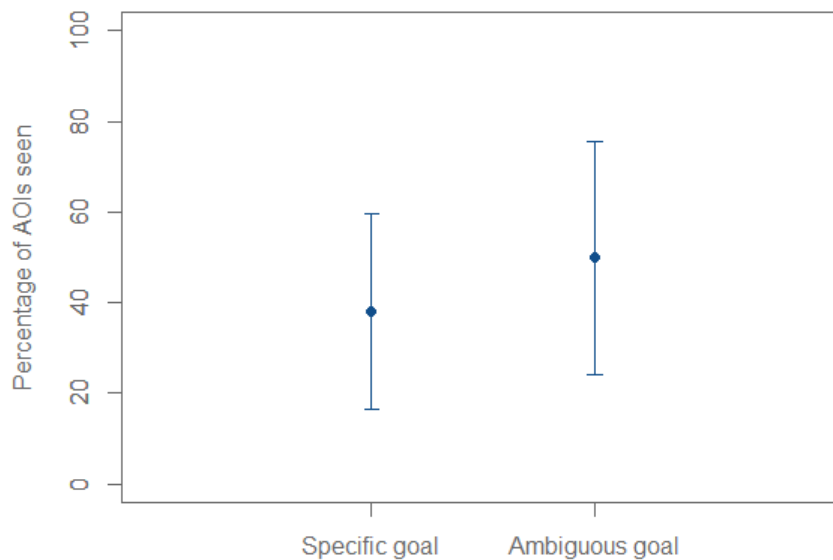


Figure 29: Percentage of AOs seen – mean and standard deviation per group

An independent samples t-test showed that the difference between the groups was statistically significant ($t(166.84) = 3.26, p < 0.05$). Thus, demonstrating that consumers with a specific goal look at significantly fewer beer pump clips than those with an ambiguous goal.

Total fixation duration

As predicted, the average fixation duration for consumers with a specific goal was lower than for those having an ambiguous goal. Consumers with a specific goal looked at the products on average for 5.55 seconds, 36% less than consumers with an ambiguous goal who on average spent 8.67 seconds looking at beer brands. However, the data for both groups was spread out, indicating variability between groups, as shown in Figure 30.

The difference in means between groups was statistically significant ($t(166.32) = 2.68, p < 0.05$). Thus, demonstrating that consumers with a specific goal spend significantly less time looking at brands at the point of purchase, whereas consumers with an ambiguous goal spend more time looking at the brands at the bar.

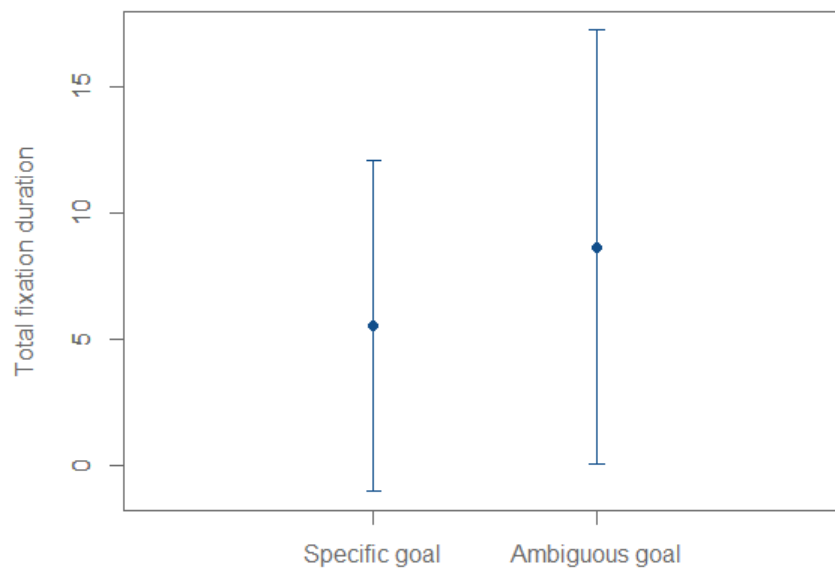


Figure 30: Total fixation duration – mean and standard deviation per group

First fixation on final choice

Thirteen individuals who have chosen a product not present at the bar were removed prior to analysis of visual attention to the chosen items. Participants with a specific goal on average made 4.29 fixations before noting a chosen item, whereas participants with an ambiguous goal made 7.27 fixations, of 69% more, as visualised in Figure 31. Respondents with an ambiguous goal varied more in the number of fixations they made as indicated by a higher standard deviation.

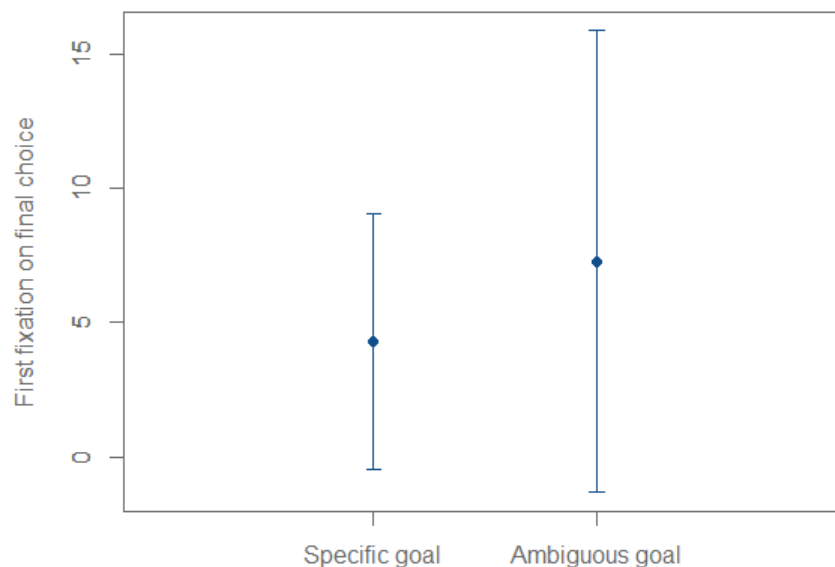


Figure 31: First fixation on final choice – mean and standard deviation per group

The results of an independent t-test showed that there was a statistically significant difference in visual attention between participants with a specific goal and those with an

ambiguous goal ($t(136.94) = 2.74, p < 0.05$). This finding highlights further differences between the groups, noting that consumers with an ambiguous goal made significantly more fixations until they noticed the subsequently chosen product.

Total fixation duration on a chosen product

To further examine the differences between goal specificity and visual attention, total fixation duration to the chosen item was compared between the groups. Participants with an ambiguous goal spent 2.52 seconds looking at the chosen item, 121% more than participants with a specific goal who on average spent 1.14 seconds looking at the chosen product. However, as with a previous measure, the consumers in an ambiguous goal group had a larger standard deviation than specific group, indicating more variability among that group (see Figure 32).

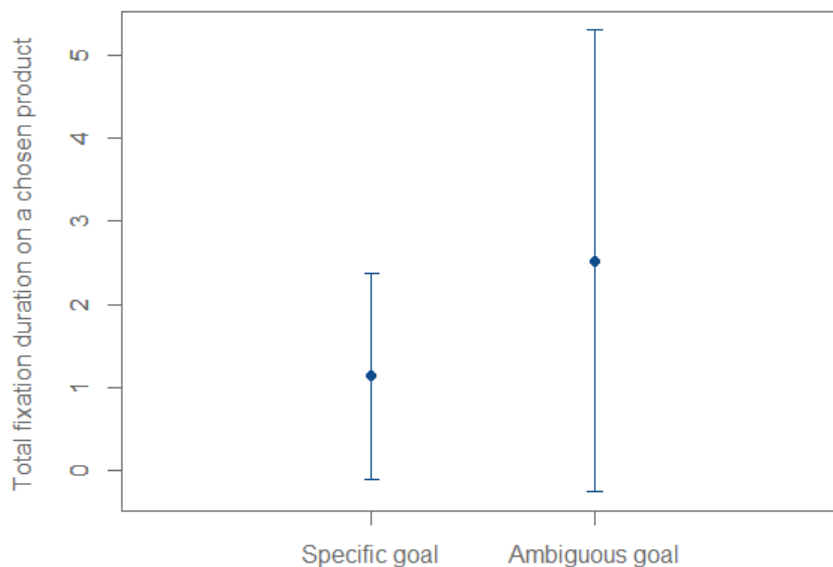


Figure 32: Total fixation duration on a chosen product – mean and standard deviation per group

An independent t-test was conducted to compare total fixation duration between participants with a specific and with an ambiguous goal. The results showed that participants with a specific goal spent less time looking at the chosen item, compared to those without a specific goal, $t(122.66) = 4.15, p < 0.05$. Thus showing that a specific goal significantly reduces the total fixation duration to the chosen item.

Specific goal consumers who purchased vs did not purchase intended product

To test this hypothesis respondents were split into two groups – specific and ambiguous goal – based on their responses to a questionnaire asking them to name the product they intend to buy. However, 44% of respondents in a specific goal group did not purchase a product they intended to buy. To examine whether there were any

differences in visual attention between respondents who bought the intended product and those that did not purchase it, a number of t-tests were conducted. It was shown that there were no significant differences between the groups visual attention as measured by the percentage of AOIs noted ($t(73.62)$, $p > 0.05$), total fixation duration ($t(67.3) = 1.03$, $p > 0.05$) and the number of fixations before looking at the chosen item ($t(60.4) = 1.24$, $p > 0.05$). Hence, there is not enough evidence to consider these groups as different. Thus, although a number of respondents did not purchase the specific product they intended, the sheer presence of a specific goal reduced visual attention to the products at the point of purchase in a pub.

Summary

The current hypothesis set out to assess the influence of goal specificity on consumer's visual attention to products at the point of purchase in a real shopping environment. The results have consistently shown that having a specific goal significantly reduces visual attention to the products at the bar. The effect was significant for all measures of visual attention used in the current study – percentage of AOIs seen, total fixation duration, first fixation on final choice and total fixation duration to the chosen item. The results do not seem to be affected by whether consumers actually proceeded with their specific goal or switched and purchased a different product. Hence, these results support the hypothesis that specific goals reduce visual attention to products at the point of purchase in a real pub.

3.5.1.3. VISUAL ATTENTION AND CHOICE

H3: Increased visual attention to a brand leads to an increased likelihood of it being chosen

Two approaches were used to assess the relationship between visual attention and choice. At first, the differences in visual attention as measured by total fixation duration and visit count on chosen and non-chosen products for each participant was examined. The aim was to assess whether a significant difference exists between participants' visual attention to the chosen item and average of noted non-chosen items. As two data points were compared for each participant, a paired samples t-test was undertaken as it is the most appropriate test for this data (Sekaran and Bougie, 2016).

Secondly, the influence of the order in which the chosen item is looked at is assessed. In this instance, a frequency table was created summarising the order in which a chosen product was noted. To test whether the order in which a product was noted influences choice or whether the observed pattern can occur by chance alone,

Pearson's Chi-squared test was used, which is the most appropriate test to assess this relationship (Gray, 2014).

Total fixation duration on a chosen vs non-chosen product

To assess the relationship between visual attention and choice, a t-test was undertaken to compare the amount of visual attention on chosen and average of noted non-chosen products. The analysis was done on a sample of 156 respondents, excluding 22 respondents as they either did not look at any of the pump clips or chose a beer which was not featured at the point of purchase.

On average, non-chosen items were looked at for 0.8 seconds, whereas chosen items got 138% more attention (1.9 seconds), as shown in Figure 33. Total fixation duration on a chosen item was quite varied, as indicated by a large standard deviation.

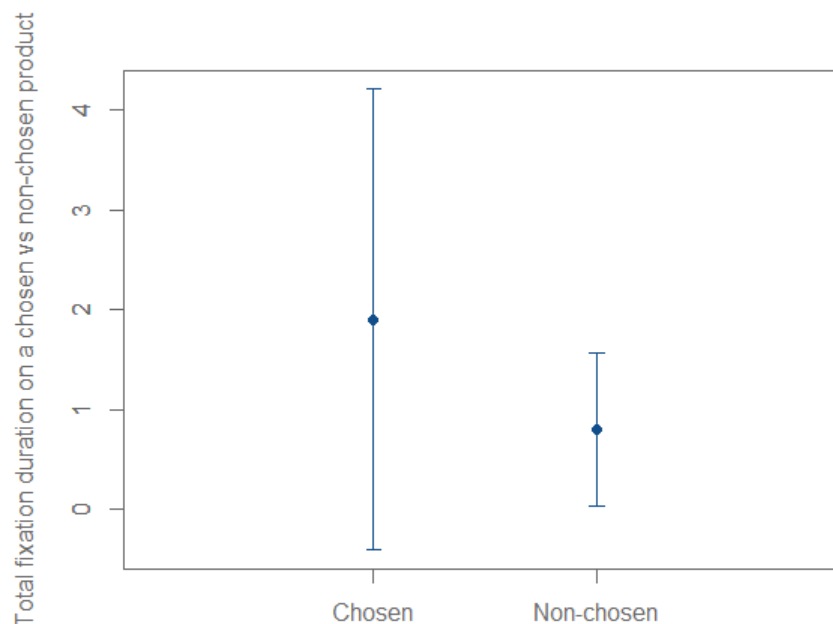


Figure 33: Total fixation duration on a chosen vs non-chosen product – mean and standard deviation per group

The difference between total fixation duration to the chosen item and the average of non-chosen items was statistically significant, $t(155) = 7.05$, $p < 0.05$. Thus, demonstrating that the chosen brands received significantly more visual attention than the non-chosen brands.

Visit count on a chosen vs non-chosen product

To assess whether higher duration of visual attention was due to longer individual visits or an accumulation of smaller visits, visit count metric was used. The chosen items on average received 47% more visits than non-chosen items, or 3.39, compared to 2.3

visits. However, just as with a previous metric, the attention to the chosen product was associated with a much more variable data, as shown in Figure 34.

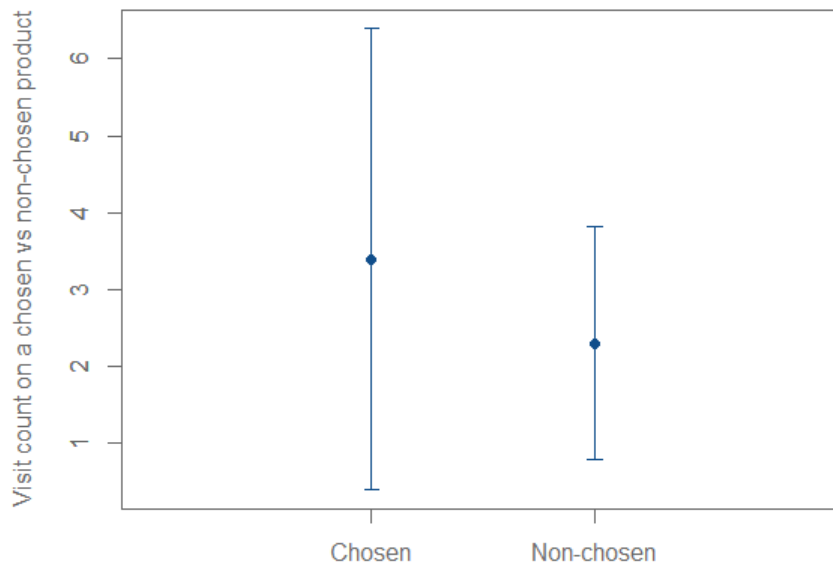


Figure 34: Visit count on a chosen vs non-chosen product – mean and standard deviation per group

The difference between visits to a chosen product compared to the non-chosen products was statistically significant, $t(155) = 5.88$, $p < 0.05$. Thus, demonstrating that the chosen items received significantly more visits than the non-chosen items.

Noting order

It is hard to establish causal relationship in experiments conducted in a real-life environment due to the lack of control over extraneous variables. Therefore to examine the hypothesis a slightly adapted approach than those used to test previous hypotheses was taken. An adapted version of first fixation on final choice metric was used to calculate the number of unique beers noticed until first fixation on the chosen one. Thus, providing information on how many brands consumers looked at before noting the chosen one.

The results showed that 15% of 156 consumers who chose a beer from the pump clips made the choice without making any fixations on the product, as shown in Figure 35. In 11% of cases, the chosen item was looked at first. In further 43% of cases participants looked at between one and three other items before looking at the chosen item. Thus, in 55% of cases the chosen item was noticed at most fourth out of at most fourteen possible options (The Tram Depot pub had 14 unique brands at the bar).

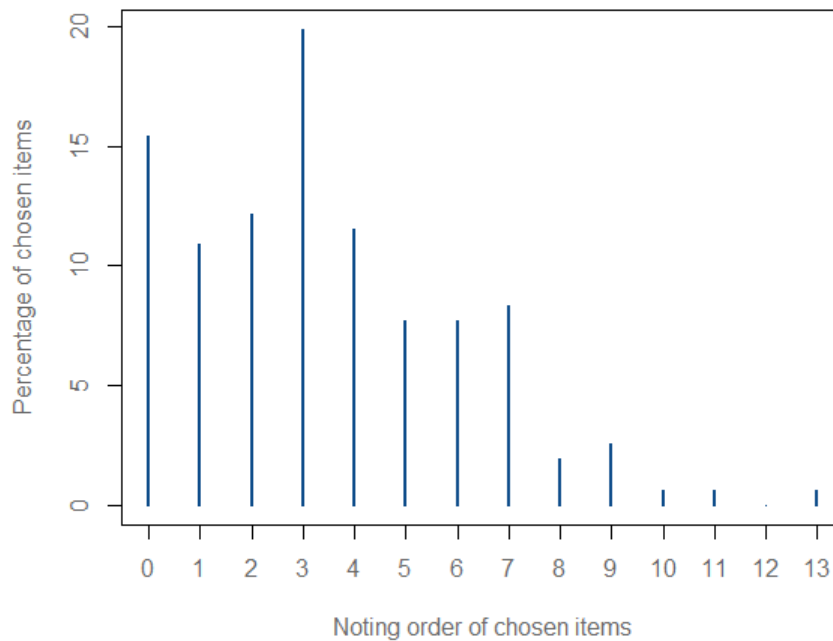


Figure 35: Percentage of chosen items noted in a specific order

0 indicates that the chosen item was chosen without being looked at. 1 indicates that the chosen item was looked at first.

Pearson's Chi-squared test of independence was conducted and demonstrated that there is a statistically significant relationship between the order in which a pump clip is noted ($X^2(11) = 88, p < 0.05$). Thus, indicating that brands attracting more visual attention earlier in a shopping journey are chosen more. As from a theoretical standpoint it is less likely that choice influenced the order in which products were noticed at the point of purchase, the results indicate that a product that attracted more visual attention earlier is more likely to be chosen.

Summary

The aim of the current hypothesis was to examine the influence of visual attention on choice. The findings showed that consumers look at the chosen items significantly longer and make significantly more visits to them. The results also demonstrated that items noted earlier during the shopping journey are significantly more likely to be chosen. Hence, there is evidence to support the hypothesis that visual attention positively influences product's choice likelihood in a real pub environment.

3.5.2. ADDITIONAL FINDINGS

This section lists some further findings, not relating to the specific tested hypotheses, that were uncovered during the data analysis. In order to better understand the relationship between venue familiarity and goal specificity, Pearson's Chi-squared test

of independence was conducted. The results demonstrated that there is no association between goal specificity and familiarity, $X^2(2) = 5.91$, $p > 0.05$. However, when familiarity is recoded into two levels – first time and having been to the venue – the results are different and statistically significant, $X^2(1) = 4.69$, $p < 0.05$. This findings implicates that having ever been to the venue makes it more likely that participants formulate a preference. Of those who visited the pub for the first time, just over a third (35%) had a specific intention. However more than a half of those who have previously visited the venue (53%) had a specific goal to purchase a product.

Although the current research project did not aim to compare the interactions between venue familiarity and goal specificity and its influence on visual attention, some descriptive findings show interesting relationships between the variables. A group of regular customers with a specific intention looked at 33% of the visual scene, whereas a completely opposite group of first timers with no intention looked at 59% of the scene or 79% more. Furthermore, first time visitors with no intention spent just over 12.32 seconds on brands, or 124% more than regulars with no intention who only spent 5.5 seconds. These findings, although descriptive, provide some evidence that consumers who are unfamiliar with the venue and have an ambiguous goal observe and attend to a much larger part of the point of purchase than those who are familiar with the venue and have a specific goal.

Furthermore, in the previous section it was noted that 15% of consumers made a product choice without ever looking at the pump clip. Descriptive results show that 38% of those consumers were first time visitors (or 9 people).

Additionally, as it could be intuitively expected, consumers with a specific goal are 67% more likely to order a beer without ever looking at the pump clips than consumers with no intention (or 15 people). However, just as the previous point the results are based on a small sample.

4. DISCUSSION

The aim of the current study was to investigate the visual attention of consumers in a novel, real-life shopping environment – a pub – to examine whether current knowledge can be generalised to a different retail setting that is characterised by a set of unique features (for details of the unique characteristics of a pub environment, see Table 1). More specifically, the project set out to examine how familiarity with the pub venue influences consumers' visual attention to its environment, how venue familiarity and consumer goals impact attention to the brands at the point of purchase and how visual attention to the brands affects their choice likelihood. In order to address the research questions, the visual attention of 178 visitors who intended to purchase beer was recorded during their shopping journey. Data were collected in three pubs in the United Kingdom – one in Cambridge and two in London. A brief questionnaire was administered in order to determine how familiar the respondents were with the venue and whether they had a specific beer brand they intended to purchase. Subsequently, a range of statistical tests (ANOVA, the T-test and the Chi-squared test) were carried out in order to investigate the differences in visual attention between the groups of consumers.

The results demonstrated that familiarity with the venue did not influence visual attention to the pub environment – consumers exhibited similar visual attention patterns regardless of their familiarity level. However, familiarity with the venue had a significant effect on visual attention to the brands at the point of purchase. Higher levels of pub familiarity were associated with less visual attention to the pump clips. Similarly, goal specificity had an effect on visual attention to the brands. Consumers with a specific goal paid less attention to the brands at the point of purchase. Lastly, greater visual attention to a brand was associated with a higher choice likelihood for the brand. Therefore, brands receiving more visual attention were more likely to be chosen.

The following section starts by discussing the findings of the current project in more detail. Afterwards, the theoretical and practical implications of the findings are provided, followed by sections outlining the limitations of the study and providing suggestions for future research.

4.1. DISCUSSION OF FINDINGS

4.1.1. FAMILIARITY AND VISUAL ATTENTION TO THE PUB ENVIRONMENT

The current study found that pub venue familiarity did not reduce visual attention to the pub environment. The distribution of visual attention throughout a pub, as measured by the percentage of areas of interest participants noticed, was very similar for first time, occasional and regular visitors and ranged between 46.4% and 47.5%. On average, as hypothesized, regular visitors made fewer visits (3.97) than first timers (5.63), but this difference was not statistically significant. Nonetheless, overall, the results show that greater pub venue familiarity does not reduce visual attention to the pub environment, rejecting hypothesis H1a.

The body of literature examining the influence of store familiarity on visual attention to the real store environment is extremely limited, and the few studies that have tested these relationships have returned mixed results. The findings of the current project are consistent with those of Otterbring et al. (2014), who reported that familiarity with a specific supermarket did not influence consumer's attention to in-store signs – an element of the shopping environment that they investigated. The results also corroborate the findings reported by Gidlöf et al. (2017), who noted that familiarity with a store did not influence visual attention to the brands at the point of purchase – a partial element of customer journey. However, the conclusions of the current study contrasted with those of Clement, Kristensen and Grønhaug (2013), who demonstrated that being familiar with a supermarket reduced visual attention to brands – a stage in consumer decision process. The current study provides more expansive insight into the distribution of visual attention around the environment, compared with Otterbring et al. (2014), who measured only one element of the environment (navigation signs), and Clement, Kristensen and Grønhaug (2013) together with Gidlöf et al. (2017) who only examined a single stage of the shopper's journey (in aisle decision-making).

Interestingly, Otterbring et al. (2014) noted that although familiarity with the store did not influence visual attention across the whole customer journey, it did influence it during the navigation stage where familiar customers paid less attention to navigation signs than unfamiliar customers. This suggestion was reinforced by Clement, Kristensen and Grønhaug (2013), who noted that when choosing between brands at the point of purchase in a real supermarket, consumers familiar with the shopping environment made their choices faster. Therefore, the influence of familiarity with the store on shoppers' visual attention may differ between the stages of their in-store

decision-making. As a result, by looking at the relationship between familiarity and visual attention throughout the whole customer journey, studies could fail at identifying the relationships at some specific stages. Thus, perhaps the visual attention of participants in the current study differed during the stages of their task performance (approaching the bar, making a choice, placing an order), and by examining the relationships throughout the whole journey, the differences between stages could have been overlooked.

However, the current results are inconsistent with the findings of laboratory-based studies of familiarity and visual attention. As summarised in Table 3, studies conducted in a laboratory environment have tended to conclude that visual attention is reduced with greater familiarity. In contrast, the findings of studies conducted in real-life shopping environments have tended to reach mixed conclusions, as was further supported by the current project. Perhaps laboratory-based studies allow better control of the experimental and other extraneous variables thus facilitating the exploration of differences between the groups. While in less controlled studies carried out in real environments, the relationships may become less pronounced.

The body of literature on the influence of store familiarity on visual attention is limited, yet studies have examined how visual attention is influenced by other types of familiarity, such as familiarity with advertising, brands or product categories, businesses, tasks and settings. Although the findings of these projects tended to be consistent and showed that visual attention of consumers reduced with greater familiarity, in some cases the results showed that the studied type of familiarity had an influence on the distribution of consumers' visual attention. For example, research conducted using advertisements as stimuli by Pieters, Warlop and Wedel (2002) found that familiarity with an ad reduced visual attention to its text, but increased visual attention to the brand and imagery. In contrast, a subsequent study by Pieters and Wedel (2004) concluded that higher familiarity with an advertised brand generated completely opposite results – people looked more at text, but less on the other ad elements. Thus, demonstrating that although the same stimuli were used, the type of familiarity investigated influenced the visual attention of the consumers. The concept of familiarity used by researchers is quite broad; it is defined as increased interactions with the studied stimulus, whether a brand, an advertisement or a real store (Alba and Hutchinson, 1987). This indicates that consumers more familiar with an advertisement exhibit similar visual attention patterns to those familiar with a store environment. However, studies examining store familiarity and its influence on visual attention, including the current study, have tended to reach conflicting conclusions. Although the

volume of research is limited, perhaps the concept of store familiarity differs from other types of familiarity, thus resulting in different findings.

Another possible explanation of the results lies in the methodological approach adopted by the current study. The respondents were recruited as soon as they entered the pub, as in some venues it was not possible to start data collection outside it. Thus, although great care was taken to ensure that consumers looked as little as possible at the pub environment, some respondents may have glanced at the scene prior to the commencement of the eye-tracking part of the experiment. Prior research has noted that a single fixation on a scene is enough for respondents to get the gist of it (Rayner, 1998). Therefore, perhaps the differences between groups existed on venue entry, but the experimental set up was unsuccessful in capturing them. Additionally, there are multiple ways of defining AOIs. The current project used the content and location method, resulting in AOIs of multiple sizes. Perhaps this approach did not enable the researcher to capture the true differences in respondents' visual behaviour.

Similarly, previous research examining how familiarity with advertising influences visual attention to it has demonstrated that the metrics used to measure visual attention can influence the research outcome. For example, Pieters, Rosbergen and Hartog (1995) looked at the number of elements skipped and the order in which they are viewed as measures of visual attention. Their results indicated that familiarity influenced the first but not the second measure. The chosen metrics in the current project aimed to assess both the breadth and the amount of visual attention to the areas of interest of different sizes. However, other measures of visual attention may have led to a different research outcome.

4.1.2. FAMILIARITY AND VISUAL ATTENTION TO BRANDS

The research findings demonstrated that consumers who were more familiar with a shopping environment were less visually inquisitive and paid less attention to the brands at the point of purchase. Regular visitors noted significantly fewer areas of interest than first timers, 39% compared with 51%. Similarly, greater familiarity with the pub negatively influenced the time consumers spent looking at the brands. On average, regular visitors spent 5.13 seconds looking at the brands, statistically significantly less than first timers (10.11 seconds). Whereas visual attention to all items was influenced by familiarity with the pub, it did not seem to influence how efficient consumers were at finding the chosen brand. First timers on average made 6.09 fixations before noting the chosen brand and regulars made 4.42 fixations, but the differences were not significant. Nonetheless, familiarity with the venue had a significant effect on how much

time consumers spent looking at the chosen item. While regular consumers spent on average 1.12 seconds, first timers spent 2.59 seconds. Together, these results demonstrate that for three out of four of the measures of visual attention used in this study, greater store familiarity reduced visual attention to the brands, thus partially supporting H1b.

The finding that familiarity with a store negatively influences visual attention corroborates the conclusions reached by Clement, Kristensen and Grønhaug (2013) who demonstrated that greater familiarity with a grocery store reduced visual attention to the brands. However, the results contradict the conclusions of Gidlöf et al. (2017), who showed that familiarity with a supermarket did not influence visual attention to brands. The difference is likely to be caused by the different ways in which the researchers measured visual attention. Clement, Kristensen and Grønhaug (2013) and the current study used a similar measure of familiarity – the respondents self-reported their prior experience of the venue. Gidlöf et al. (2017) on the other hand manipulated familiarity by asking respondents to complete a shopping task in different supermarket branches. Yet, as they were of the same chain, the shops were likely to have a similar layout and arrangement of merchandise. Thus, resulting in a less accurate measurement of familiarity with the real environment.

Overall, the finding of the current research is consistent with those of research carried out in other settings and with other types of familiarity, as summarised in Table 3. Prior research has demonstrated that as consumers become more familiar with advertisements, brands, businesses, tasks and settings their visual attention to the stimuli decreases.

The finding that familiarity with a store reduces visual attention to brands is likely explained by consumers starting to use heuristics to make decisions during repeated visits to a pub (Tversky and Kahneman, 1974; Gigerenzer, 2008). As consumers visit the venue more, perhaps their behaviour becomes routine and they become less likely to examine the brands on offer. This could result in them purchasing the same brand on every occasion, which subsequently requires them only to locate the brand at the bar to ensure it is available or even to place an order with the bar staff without looking at the products.

This observation is further supported by the results of the questionnaire analysis, demonstrating that consumers' familiarity and goal specificity are related. The results showed that having been to the shopping environment before shapes visitors' goals and makes them more likely to have a specific goal. The descriptive results also

showed that consumers familiar with a specific goal only looked at 33% of the pump clips at the point of purchase, whereas first time visitors with an ambiguous goal looked at 59% of the scene. Thus demonstrating that those with more experience with the venue tend to have a specific product in mind on venue entry, which results in reduced visual attention. The findings may be linked to the theory of habit formation (Aarts and Dijksterhuis, 2000). As consumers visit the venue more, they are more likely to establish a routine such as purchasing a specific product and thus are more likely to have a specific purchase goal on venue entrance.

Another possible explanation of the finding that consumers familiar with a pub do not engage in a wide search is that consumers with greater familiarity with the venue perceive themselves as becoming expert consumers. Therefore, they start to feel overconfident in their abilities, which reduces their perceived need and motivation to gather extra information (Nedungadi, 1990; Wood and Lynch, 2002). Consumers with greater familiarity do not engage in an extended visual search to look for extra information despite requiring less cognitive effort than unfamiliar consumers to gather new information (Hoch and Deighton, 1989).

The results also showed that of the 15% of respondents who placed orders without looking at the brands, 38% were first time visitors. The current project did not examine how the participants made their choices. Nonetheless, it is possible that unfamiliar consumers relied on staff recommendations to make their purchases. Following the recommendations, the consumers did not look at the pump clip to reaffirm their choice. The consumers may have viewed the bar staff as people in a position of authority, as suggested by Cialdini and Goldstein (2004), thus overriding the need for consumers' visual search behaviour.

4.1.3. GOALS AND VISUAL ATTENTION

The results of the current study indicated that consumers with a specific goal tend to pay less visual attention to the brands at the point of purchase compared with consumers with an ambiguous goal. Goal specificity made consumers more focused in their visual attention, noting 38% of the pump clips, significantly fewer than those with an ambiguous goal, who looked at 50% of the brands. Shoppers with a specific brand in mind also looked at the brands at the point of purchase for 5.55 seconds, whereas consumers with an ambiguous goal spent 8.67 seconds. This difference was statistically significant. The participants looking to purchase a specific brand also made significantly fewer fixations on the brands before noting their chosen one, 4.29 compared with 7.27. Lastly, consumers with a specific goal spent on average 1.14

seconds looking at the chosen brands, significantly less than the shoppers with an ambiguous goal, who spent 2.52 seconds. These findings consistently showed that goal specificity reduced visual attention to the beer pump clips, therefore supporting hypothesis H2.

The finding of the current project that in a real-life shopping environment goal specificity reduced consumers' visual attention to brands at the point of purchase is consistent with the results of previous papers that examined these relationships. The results support the preliminary conclusions reached by Clement (2007), who showed that consumers making purchases in a real supermarket carrying shopping lists, thus having more specific goals, tended to note fewer brands than those without shopping lists. However, Clement's (2007) findings were not statistically significant. Furthermore, this study confirms that consumers with a specific goal noted significantly fewer areas of interest when shopping in a real grocery store, as shown by Wästlund et al. (2015). In their experiment, consumers given a specific goal made on average 81.04 visits to the areas of interest areas, compared to 127.19 by consumers with a specific goal.

However, the findings of the current research directly contradict those reported by Wästlund et al. (2015) in their third field experiment. The researchers noted that consumers with a specific goal made significantly more visits on areas of interest than those with an ambiguous goal (on average 23.39 visits compared with 15) when choosing a brand in a real supermarket. These contrasting findings within one paper are discussed in more details in the Literature Review section, however, they were likely caused by the different tasks given to the respondents in the two experiments. In the second experiment Wästlund et al. (2015) asked respondents to find a specific winter jacket from an advertisement, whereas in the third experiment the researchers asked the participants to find a specific coffee as "requested by the boss". Perhaps this task, framed as a request from a person in a position of authority, made a specific task harder than an ambiguous one.

Furthermore, the finding that consumers with different goals exhibit different visual attention patterns substantiates previous findings in the literature. This finding supports the descriptive observations noted by Harwood and Jones (2014) who stated that consumer goals influence the direction of their visual attention when shopping in a department store. For example, consumers who entered a store to purchase a specific brand paid attention to different in-store stimuli than those who entered a store just to browse the products. The finding also corroborates the conclusions of the first experiment conducted by Wästlund et al. (2015), who noted that the visual patterns of

consumers at the gas station differ depending on what they aimed to purchase – gas only or gas and additional products.

The results also support the notion that goal types influence visual attention to advertisements and brands, as shown in the experiments conducted in simulated environments. Prior research, as summarised in Table 4, has shown that assigning consumers to groups and providing them with different goals significantly influences their visual attention patterns, both in laboratory and real environments.

A possible explanation for the reduced visual attention of the specific goal group is that consumers who have a specific brand in mind are likely to remember it better – its name, brand colours and potential location at the bar. More memory of a product enhances visual processing of the relevant attributes, resulting in increased top-down salience (Van Der Lans, Pieters and Wedel, 2008a). As this enhancement makes the search more efficient, less visual attention is paid to the brands at the point of purchase. The notion that consumers with a specific goal look less at the brands at the point of purchase may also be explained by these participants using more of their peripheral vision during their choice task. This supported the findings of a recent article by Wästlund, Shams and Otterbring (2018) that showed that consumers can use peripheral vision to direct their visual attention to the relevant products at the point of purchase.

However, it is also likely that consumers with an ambiguous goal had to spend more time processing each pump clip in order to make a choice. Therefore, whereas consumers with a specific goal engaged in a search task, consumers with an ambiguous goal needed to examine the attributes of each brand, compare it with their preference and decide whether the brand meets their criteria or they should carry on their search.

4.1.4. VISUAL ATTENTION AND CHOICE

Lastly, the results provided further evidence of the relationship between visual attention and choice, demonstrating an association between visual attention and brand choice in a real shopping environment. On average, the chosen brands were looked at for 1.35 seconds, significantly more than the non-chosen ones (0.8 seconds). Total fixation duration on a chosen item was also comprised of more visits, the chosen brands received 3.39 visits, significantly more than the non-chosen ones (2.3 visits).

Furthermore, the findings of the current project demonstrated that beer brands noted earlier during the visual search were significantly more likely to be chosen. In 55% of

cases, consumers chose the beer brand they noticed at most fourth from a possible average of 12.3 brands. Therefore, these results revealed that greater visual attention to the product leads to a greater choice likelihood, supporting H3.

The finding that visual attention and choice are positively associated supports the claim made by Hendrickson and Ailawadi (2014) that in a range of commercial supermarket-based eye-tracking projects visual attention to a product category and choice were weakly positively associated. The current project also provided tentative evidence that early visual attention influences choice likelihood. The direction of this finding is consistent with the results of Gidlöf et al. (2017) who noted that greater amount of visual attention strongly predicts product choice.

Nonetheless, the results of the current project contradict the findings of Clement (2007), who found no difference in visual attention between chosen and non-chosen brands during the first stages of consumer decision-making process in a real supermarket. The findings are also in contrast with those of Otterbring et al. (2014), who did not find a relationship between increased early visual attention and product choice in a real supermarket aisle. Yet it should be noted that Clement's (2007) study used an early eye-tracking technology which perhaps did not enable the researcher to find the differences between the groups. In contrast, Otterbring et al. (2014) only analysed data for two products – target and control – and not the whole aisle. It is thus possible that visual attention and choice were related, but the methodology of the study did not examine this relationship.

The finding that visual attention and choice are associated further supports the results of studies carried out in simulated environments. As shown in Table 5, overviewing the research findings, visual attention was positively associated with brand choice as was demonstrated in research projects using a range of stimuli – advertising, restaurant menus, products and point of purchase display.

The results of the study showed that brands that were looked at more were also more likely to be chosen. In 46% of cases, participants looked at the chosen pump clip the most. Prior research has shown that in order to cognitively process a product, consumers need to look at it (Behe et al., 2013). Therefore, it is possible that the chosen item was assessed and processed more rigorously to make sure it matches the consumer's preferred choice criteria (Huddleston et al., 2015). If the item matched this criteria or carried the most utility it was subsequently chosen (Orquin and Mueller Loose, 2013).

This project showed that consumers tend to choose the item they noticed earlier during the decision-making process. This finding is consistent with the results of researchers studying visual attention and choice in a simulated environment, such as Lohse (1997) and Lohse and Wu (2001), who demonstrated that earlier noticed ads on a page are chosen more, and Reutskaja et al. (2011), who showed that first noticed brands are more likely to be chosen. Noting a retrieval cue (a pump clip in the context of the current project) in a real environment may have primed consumers and made the product more accessible in their memory (Biehal and Chakravarti, 1983; Nedungadi, 1990). In turn, better accessibility is known to critically influence decision tasks (Biehal and Chakravarti, 1983). Choosing a product at the point of purchase is a stimulus-driven task during which cues in the environment can influence the eventually chosen product (Moore and Services, 1986). Thus, perhaps consumers further explored the scene but eventually returned to the products they saw earlier during their decision-making.

The results also showed not only that the chosen items attracted a longer fixation duration but that the anatomy of fixation duration was different. The chosen product did not get a single long visit, but an accumulation of multiple visits. Consumers also tended to return more to the chosen item, potentially comparing the attributes of the eventually chosen brand with those of other alternatives, and eliminating items that did not meet the desired criteria. This supports research on decision-making strategies indicating that a consumer eliminates items that do not meet the criteria set (Riedl, Brandstätter and Roithmayr, 2008). As visit count measure showed that consumers returned their visual attention more to the chosen item than to non-chosen item, it is possible that they were aiming to reaffirm their choice, which might have resulted in the chosen item receiving more visual attention.

Taken together the last two points indicated that perhaps consumers attended to the scene, got primed by the earlier noticed items and subsequently compared them to other products, eliminating the items that were considered to be worse options than the initially noted ones and then made a choice.

Additionally, the finding that consumers tend to choose earlier noted items and on average only scan 44% of pump clips on offer could perhaps be explained by consumers engaging in satisficing rather than rational decision-making while purchasing products in a real environment (Lynch, Jr. and Srull, 1982). The theories of rational consumer behaviour noted that consumers aim to make the decision that is likely to fully align with their preferences and satisfies their needs, defining this behaviour as

maximizing (Slote, 1989). This notion implies that given a set of options, consumers would try to assess a large number of them – if not all of them – in order to find the best option. Satisficing on the other hand means finding an item which is just good enough (Gigerenzer, 2008). The results of the current project showed that consumers scan only 44% of pump clips on offer and evaluate products within seconds, which is unlikely to result in making a rational choice. Therefore, providing further evidence that when making decisions in a real shopping environment, consumers tend to use satisficing strategies.

The current research did not measure consumers' attitude toward their chosen brand. However, the finding that consumers choose earlier noticed brands may be due to their increased liking of the product after multiple exposure, suggesting the presence of a mere exposure effect (Zajonc, 1968). Potentially, an earlier noticed product received a boost in positive attitude and was thus liked by a respondent more than subsequently noted items (Bornstein and D'Agostino, 1992). Prior research has demonstrated that even preattentive, incidental exposure to a brand name or a product can positively influence liking (Janiszewski, 2002).

4.2. IMPLICATIONS

The current section outlines the implications of the results examined in the previous section. Due to the real-life setting of the study, both theoretical and practical implications are discussed.

4.2.1. IMPLICATIONS FOR THEORY

The theoretical implications of the current project are examined in four parts. First, the implications of the results are outlined in relation to the research questions, followed by the implications of the results for the research methodology. Each subsection briefly summarises the concept and restates the gap in the literature, then outlines the contributions made by the study.

4.2.1.1. SHOPPING ENVIRONMENT FAMILIARITY AND VISUAL ATTENTION

Research in the field of psychology has long examined the concept of environmental familiarity on the behaviour of animals as well as humans. For example, mammals such as rats exhibit more stress and behave differently in unfamiliar environments than familiar ones (Campbell and Raskin, 1978). Humans also demonstrate different behaviour when visiting environments they are familiar with (Titus and Everett, 1995).

The notion is based on the finding of memory research that consumers who have visited the environment multiple times form memories of their surroundings and therefore do not need to look for the same cues to find a stimulus or navigate the environment (Hoch and Deighton, 1989; Dogu and Erkip, 2000).

The concept of familiarity is closely associated with learning and memory, as increased exposure to the environment results in consumers' learning more about it, thus increasing their familiarity. Essentially, as people learn more details about products or environments, they become more familiar with them which is subsequently associated with reduced attention (Rheingold, 1985). For example, prior research has shown that shoppers in a more familiar store environment tend to notice fewer in-store cues (Inman, Winer and Ferraro, 2009). Familiarity is among the most studied influencers of visual attention (Wedel and Pieters, 2006). Yet prior research has predominantly focused on using advertising and products as stimuli, concluding that greater familiarity tends to be associated with less visual attention to the studied stimuli (for example Pieters, Rosbergen and Hartog, 1995; Pieters, Rosbergen and Wedel, 1999).

Huddleston et al. (2018) recently reviewed the studies that assessed visual attention in real stores and concluded that future research needs to examine how familiarity with a store environment influences consumers' visual behaviour. The current project aimed to fill this gap and examine how familiarity with a store influences visual attention to its environment, as well as to the brands at the point of purchase. The literature review demonstrated that only a few studies (see Table 3 for a summary) have examined the influence of store environment familiarity on visual attention in a real setting, and all of them were carried out in supermarkets. Thus, the current study chose a different retail shopping environment – a pub – which possesses a range of unique features (see Table 1 for details) and aimed to examine how familiarity with this novel and unique setting influences the visual attention of shoppers to the in-store environment, as well as to the brands at the point of purchase (beer pump clips).

The results of this study provided novel empirical insights into how the levels of store familiarity influence shoppers' visual behaviour in a real shopping environment. The results indicated that greater familiarity led to a lower amount of visual attention to the brands at the point of purchase, although not to the general areas of its environment. Prior research investigating this topic has been limited, with only a few papers examining the relationship in a real shopping environment (Clement, Kristensen and Grønhaug, 2013; Otterbring et al., 2014; Gidlöf et al., 2017). Otterbring et al. (2014) only partially investigated the influence of store familiarity on visual attention to the

store environment, examining only how familiarity influences visual attention to navigation signs. Clement, Kristensen and Grønhaug (2013) and Gidlöf et al. (2017) reached mixed conclusions, with the first author concluding that familiarity with a store reduces visual attention to products, and the latter reporting no relationship. Therefore, the current study has expanded knowledge by demonstrating how familiarity with a store influences shoppers' visual attention to its environment throughout their whole shopping journey, and provided further support to the mixed body of knowledge of how familiarity with a venue influences visual attention to the products at the point of purchase.

The current project also contributed to understanding of the relationship between familiarity with a store and visual attention by studying the relationship in a novel environment. Prior research that has examined this link in a real environment has been conducted in a real supermarket (Clement, Kristensen and Grønhaug, 2013; Otterbring et al., 2014; Gidlöf et al., 2017), whereas the current project has studied the link between the variables in a novel shopping environment – a pub. The testing of the hypothesis in a new research setting provided further generalisability to the body of knowledge. The results of the current project were consistent with the findings of Otterbring et al. (2014), showing that familiarity with a store does not influence visual attention to its environment, and those of Gidlöf et al. (2017), who showed that greater familiarity with a store environment reduced visual attention to brands at the point of purchase. This consistency in research conclusions conducted in different settings and with different samples adds to the validity and reliability of the findings.

Furthermore, the conclusion that increased familiarity reduced visual attention to products at the bar generalised the findings of research conducted using other marketing stimuli – advertising, products and brands, images of product shelves – to real-life shopping environments. Studies have overwhelmingly demonstrated that increased familiarity with an advertisement (Pieters and Wedel, 2004), a product (Chandon et al., 2009) or a setting (Drèze and Hussherr, 2003) reduces visual attention. The current study reached similar conclusions, thus generalising the results from a laboratory-based research to complex, real-life environments. The consistency of the results also adds validity and generalisability to the findings.

The findings of the study indicated that consumers' visual attention patterns differ between the stages of their decision-making in a pub. Throughout the whole shopping journey, visual attention between the groups of consumers with various levels of familiarity remained the same, whereas their visual attention significantly differed

during their product choice stage. This implies that at different stages of the shopping journey, such as entering a venue, locating products and picking a product, the influence of familiarity on visual attention may vary. The literature has shown that consumer decision-making consists of multiple stages (Andrews and Srinivasan, 1995). Previous research examining the visual attention of consumers in a laboratory environment (Russo and Leclerc, 1994) and in a real supermarket (Clement, 2007) has demonstrated that the visual patterns of consumers differ according to the stage of their decision-making. The results of the current project provided further support for this finding, indicating that the visual attention of shoppers differed between the stages. Although no differences in visual attention were found throughout the whole shopping journey, greater familiarity with a pub made consumers less visually inquisitive during the choice part of their task while they were examining brands at the point of purchase. This finding was consistent with Otterbring et al.'s (2014) observation that familiarity with a supermarket did not influence consumers' visual attention to supermarket signs overall, but influenced and reduced their visual attention at the navigation stage, thus adding validity and reliability to the results.

The current project added to a limited number of research papers examining the relationship between familiarity with a shopping environment and visual attention. The literature review of studies examining familiarity with other stimuli such as advertising, brands and settings conducted in a simulated environment consistently demonstrated that greater familiarity is associated with reduced visual attention (see Table 3 for a summary). Yet studies investigating familiarity with shopping environment in real settings, including the current study, have tended to reach mixed conclusions. This observation could imply that familiarity with the shopping environment could be influenced by elements not observed and studied by the researchers, indicating that further definition of the store familiarity concept is needed.

Furthermore, the project contributed to our understanding of consumer behaviour in a real shopping environment. The findings are consistent with the view that having more memory of an environment or greater familiarity with it influences consumer behaviour, including visual attention behaviour (Titus and Everett, 1995). The study showed that consumers familiar with a shopping environment are more likely to have a specific goal on entry to the venue and they appear to exhibit more routine behaviour. This implies that repeated visits to a pub environment is associated with consumers' developing more habitual decision-making and heuristics. Visitors familiar with the environment are less likely to use their cognitive resources and evaluate the product offering and are more likely to rely on their memory while making product choices.

The results of the current study also provided tentative evidence of the importance of front line service employees (in this case bar staff) in the choice process. It was shown that 15% of consumers chose a product without ever looking at the brands at the point of purchase. Although it is possible that consumers suddenly recalled a brand they wanted to purchase or failed to indicate their intention in a questionnaire, the most likely explanation for this observation is that they have asked or were offered an advice about the product they should purchase. This indicates that when a recommendation is provided by bar staff, consumers new to the shopping environment conform to it without even looking at the products on offer, supporting the notion introduced by Cialdini and Goldstein (2004) that individuals follow the advice of other people they see in a position of authority.

4.2.1.2. GOALS AND VISUAL ATTENTION

The concept of goals and their influence on the behaviour and productivity of people has been researched in depth in the field of psychology (Austin and Vancouver, 1996). Multiple meta-analyses over the years have been conducted to summarise a wide range of studies that focused on the influence of goals on people's behaviour (Wood, Mento and Locke, 1987; O'Leary-Kelly, Martocchio and Frink, 1994; Kleingeld, Van Mierlo and Arends, 2011). These results strongly suggest that goals shape and influence how humans behave. Goals have different attributes, which are split into two broad groups – content (goal specificity and goal difficulty) and intensity (scope, clarity, mental effort required to fulfil a goal) (Latham and Locke, 1991). The focus of the current project was on a goal content attribute – goal specificity.

Most research on the influence of goal specificity on people's behaviour has been conducted in the area of management to examine how workers' performance is affected by the type of goal they are given. The literature suggests that specific goals are associated with more efficient performance outcomes (such as Latham and Locke, 1975; Latham and Yukl, 1976; Gollwitzer and Brandstätter, 1997). Research in the field of marketing has demonstrated that the specificity of consumers' goals influences their shopping behaviour. For example, consumers with ambiguous goals tend to include more product in their consideration sets – the products they consider choosing – as they seek more variety (Kushwaha and Shankar, 2013). Furthermore, consumers who have a more specific goal – such as shopping with a shopping list – tend to make fewer unplanned purchases (Abratt and Goodey, 1990). These results suggest that consumers are likely to exhibit different visual behaviour depending on the specificity of their goal.

Although some research has been carried out on how different goal types influence visual attention to advertisements and products, Otterbring et al. (2014) identified that future research ought to examine how goal specificity influences visual attention in a real shopping environment. The current project addressed this gap in the literature and examined how visual attention is influenced by specific and ambiguous goals. The literature review (see summary in Table 4) revealed that a few studies have already examined this relationship in a real environment, using a supermarket, a department store and a gas station store to gather their data. Therefore, the current project aimed to assess the relationship in a different shopping setting – a pub – to provide further insights into the influence of goal specificity on shoppers' visual attention to a point of purchase (beer pump clips) in a setting that is different from those already studied (see Table 1 for an overview).

The results of the current study provided further evidence that goal specificity has an influence on visual attention. Consumers with a specific goal spent less time looking at the point of purchase, scanned less of a visual scene and found the chosen brand quicker than consumers with an ambiguous goal. These results add to the findings reached by Clement (2007) and Wästlund et al. (2015), who also showed that goal specificity reduces the visual attention of consumers to products in a real shopping environment.

Additionally, the current project examined the link between goal specificity and visual attention in novel retail settings. Research carried out so far by Clement (2007) and Wästlund et al. (2015) in a real environment collected data in a supermarket, a department store and a gas station store – retail settings that have similar characteristics. In contrast, the current study contributed to the literature by studying the influence of goal specificity on visual attention in a pub, a novel and different retail setting, concluding that goal specificity reduces visual attention to the products at the point of purchase. This findings is consistent with the research outcome reported by Clement (2007) and partially supports the findings of Wästlund et al. (2015). As the current project was able to replicate the results of papers studying a similar research question but in a different environment with a different sample, it provides further validity and reliability to the results.

More broadly, the study empirically demonstrated that groups of consumers with different goals exhibit different visual attention patterns, thus contributing to a small number of studies that have examined this topic so far. This finding confirms prior research carried out in the real environment by Harwood and Jones (2014) and

Wästlund et al. (2015), who noted that the goal consumers have influences the direction and characteristics of their visual attention. This further supported the results.

Furthermore, a number of researchers using advertising and products as stimuli in their research have concluded that consumers with different types of goals exhibit different patterns of visual attention (for example Pieters and Wedel, 2007; Chandon et al., 2009). Therefore, the results of the current project generalise these findings to a more complex, real shopping environment, adding further validity and reliability to the results. The overwhelming consistency in the results adds further robustness to the findings, demonstrating that the broader principle of how goals influence visual attention appears to be consistent, regardless of the studied stimuli, therefore generalising the results to a new setting.

Another major contribution of the current study is the methodological approach is assessing consumer goals instead of assigning them to consumers. With the exception of Harwood and Jones (2014), the studies conducted in both laboratory and real-life settings reviewed in the current project (see Table 4 for summary) gave tasks to consumers in order to split them into groups. Harwood and Jones (2014) asked consumers to state what they came into the department store to do and concluded that the goals consumers had influenced the direction of their visual attention, although the study was exploratory and descriptive in nature. The fact that the conclusions of the current project, which relied on real goals of consumers, are consistent with studies that assigned goals to consumers supports the validity of these findings. This observation also indicates that assigning consumers to a specific goal group causes them to exhibit similar visual attention patterns as when they seek to achieve goals decided upon themselves.

Furthermore, the study provided empirical support for the goal-setting theory (Locke and Latham, 2002), which states that the goals people have influence their action. The current project demonstrated that respondents' visual behaviour was influenced by their goals. The results demonstrated that consumers with a specific goal exhibit different patterns of visual behaviour than consumers with an ambiguous goal, more specifically those with a specific goal note fewer pump clips, look less at the beer brands at the point of purchase and saw the chosen brand earlier. Therefore, showing that goal types not only influence people's actions and performance, as was suggested by prior research but also, as this study suggests, affect their visual search behaviour.

4.2.1.3. VISUAL ATTENTION AND CHOICE

In the field of psychology, visual attention has been a focus of research for a long time (Bundesen, 1990). Researchers have aimed to identify what drives attention and how people undertake visual search, and proposed choice models influenced by visual attention (Palmer, Ames and Lindsey, 1993; Bundesen, 1987). The stance in the marketing literature during that period was different. Although researchers have shown that salient objects receive more attention (Lynch, Jr. and Srull, 1982), the literature has not explicitly studied this finding with marketing stimuli to test its generalisability. The notion that visual attention influences choice was taken for granted by both marketing practitioners and academics, as noted by Pieters and Warlop (1999), which resulted in researchers' overlooking this specific research question.

The belief in the causal relationship was probably influenced by other papers that hinted at the relationship without explicitly studying it. The proxy for the link between visual attention and choice was the positive influence on sales of the product's retail shelf space (Corstjens and Doyle, 1981), in-store price promotions plus end-of-aisle display (Bemmaor and Mouchoux, 1991) and special in-store displays (Chevalier, 1975). In all of these cases, greater number of product facings or more salient position was likely to influence visual attention that perhaps in turn contributed to an actual sale.

More recently, a range of researchers have called for further investigation of the relationship between visual attention and downstream marketing effects – memory, consideration and choice (Pieters and Wedel, 2004; Wedel and Pieters, 2008a; Clement, Kristensen and Grønhaug, 2013). A recent review article examining the research conducted into visual attention of shoppers in a real environment called for further investigation of visual attention and choice in retail settings (Huddleston et al., 2018). The current project aimed to address this research question in a novel retail setting – a pub – as the literature reviewed (see Table 5 for summary) demonstrated that so far the investigations were carried out in a real supermarket.

The results of the current project add to the literature that studied the relationship between visual attention and choice in a real environment. The findings of the current project showed that consumers tend to look at the chosen products more, make more visits on them and choose a product noticed earlier during their decision-making process. The literature review demonstrated that the investigation of the relationship between the variables has been limited, with only a few papers examining it. In addition, their findings are mixed, with Clement (2007) and Otterbring et al. (2014) concluding that visual attention and choice were not linked, whereas later papers by

Hendrickson and Ailawadi (2014) and Gidlöf et al. (2017) noted that visual attention and choice are connected. Therefore, the current study contributed to the limited research and provided further evidence that visual attention and choice are associated in a real environment.

Furthermore, the major contribution of the current project is the investigation of the relationship between visual attention and choice and a novel retail setting – a pub. Previous research investigating the topic has been conducted in a supermarket and department store environments (Clement, 2007; Otterbring et al., 2014; Hendrickson and Ailawadi, 2014; Gidlöf et al., 2017). Whereas, the current study demonstrated that visual attention and choice are associated in a pub – a different research setting. This finding therefore enables to generalise the results of Hendrickson and Ailawadi (2014), who noted positive correlation between visual attention and choice, and Gidlöf et al. (2017), who noted that chosen products were looked at longer, to a novel shopping environment, adding further validity and generalisability to the results.

The findings that chosen items attract more visual attention further confirms the presence of a gaze bias – consumers looking at the chosen item more – in a real-life pub environment (Schotter et al., 2010). This finding further supports a general trend evidenced in the literature that greater visual attention is associated with greater choice likelihood which was conducted with a wide range of stimuli – advertising, restaurant menus, products and point of purchase displays (Table 5 provides a brief summary of the results). The current study enables to generalise this notion to a more complex, real-life environment, thus increasing the validity and reliability of the results.

Furthermore, the current project also demonstrated that products noted earlier were more likely to be chosen. This finding directly supports the observation reached by Lohse (1997) and Lohse and Wu (2001) who noted that when choosing a business from a Yellow Pages directory, businesses noted earlier on the page were more likely to be chosen than businesses which were located later on the page and hence noticed later. This consistency in findings demonstrates that conclusions made in laboratory environments can be generalised to real-life shopping environments, as both studies reached consistent results.

The investigation of visual attention and choice at the point of purchase provided further understanding of cognitive decision-making of consumers at the point of purchase. The results of the current project shown that looking at the product earlier is associated with a higher choice likelihood. This finding further demonstrates a crucial

influence of priming – making products more accessible in memory – on consumer decision-making (Biehal and Chakravarti, 1983).

The findings provided further insights on the choice strategies used by consumers. The anatomy of fixations demonstrated that consumers tend to look longer on the chosen item, but also make more returns to it. Therefore, demonstrating that consumers may use choice strategies that aimed at comparing the items and deselecting the ones that do not fit the choice criteria (Riedl, Brandstätter and Roithmayr, 2008).

Furthermore, the current project also provided evidence of consumers opting for a satisficing rather than maximising decision-making strategies, which is not necessarily the most optimal strategy (Simon, 1955), when making choices in a real shopping environment. Consumers demonstrated a limited distribution of visual attention, noting only a subset of brands on offer. Given this behaviour, the current study showed that consumers shopping in a pub demonstrated a satisficing behaviour which is characterised by limited use of cognitive resources and finding the items that are just good enough to do the job (Simon, 1955; March and Heath, 1994).

4.2.1.4. METHODOLOGY – RETAIL ENVIRONMENT, PROCEDURE AND MEASUREMENTS

The current study gathered visual attention data of consumers in a novel environment, which enabled to examine implications that environment has on a research project. Additionally, the implications of the measures and procedure used in the current study are outlined.

The visual attention of shoppers in this project indicated that the amount of visual attention consumers direct to the products in a pub is similar to the products in other retail settings such as supermarkets, department stores, sport stores and gas stations. For example, on average pub visitors noted 44% of beer pump clips on offer. Whereas Clement, Kristensen and Grønhaug (2013) noted that consumers looked at 38% of jams on a shelf in a real supermarket, while Gidlöf et al. (2017) stated that consumers noted 41% of brands across cereal, pasta and yoghurt categories in a real supermarket. Therefore, the consumers choosing a beer from a range of brands on a point of purchase in a pub on average paid similar amount of visual attention to shoppers in real supermarkets.

In contrast, the observations of the current product show that consumers making a choice in a real environment notice fewer options at the point of purchase than consumers making a choice in simulated environments. Participants in the current

study on average noticed 44% of products at the point of purchase. However, Young (2000) stated that consumer look at two thirds of the products on offer when they are faced with an image of a point of purchase. While Chandon et al. (2008) stated that consumers noted 68% of juices and 71% of detergents when making a choice from an image of a supermarket shelf. Therefore, these findings imply that visual attention of shoppers making a choice from images of supermarket shelves differ from those making choices in a real environment, which could have an important implication for future research.

Additionally, the current project demonstrated that the patterns of visual and consumer behaviour of shoppers in a pub differ from participants in supermarket-like real-life settings and laboratory studies. The differences appear to be caused by an availability of a service element in a pub. Early researcher into the link between visual attention and choice when browsing Yellow Pages catalogues, Lohse (1997) stated that consumers cannot choose items they do not see. This statement was also reinforced more recently by Huddleston et al. (2018) who noted that visual attention is a requisite of choice. This notion is likely to be a factor of the experiment – research undertaken in real supermarkets often requires consumers to physically pick up a product and bring it with them, which makes it highly unlikely that a product will be chosen without visual attention. Whereas laboratory-based research often features experimental shelf displays, not previously seen by respondents, thus requiring them to scan the array until they notice a product they choose. As a result, the chosen product is noticed at least once. For example, Chandon et al. (2008) demonstrated that the percentage of items considered without fixations ranged between 2.2 and 4.3, depending on a product category, when choosing a product from a projected image of a supermarket shelf. Whereas the results of Chandon et al. (2009) were even more extreme – in only one observation out 8304, a product was considered without any fixations.

In contrast, the results of the current study demonstrated that 15% of participants chose a brand without ever looking at it. This difference is most likely explained by a service element available in a pub. Whereas in other environments respondents have to locate the product they want to choose, in a pub they can approach bar staff and place their order straight away. The results showed that a small percentage of participants did so, yet the percentage is much greater than in other environments. The finding has important implications for the future research projects investigating visual attention in environments with a service element.

The results of the current project also provide insights on the validity of measurements obtained by different research procedures investigating visual attention and choice. The current project aimed to assess consumer behaviour in as natural environment as possible. They were recruited on their way to a pub, they had an intention to purchase beer and they were asked to carry on with their task while wearing the eye-tracking glasses (although they were paid for their participation). The face validity of such an approach is higher than in the studies using just choice indication or rating of purchase intention, as consumers have to go through the whole shopping process – examining the alternatives, making a choice, placing an order, paying for their chosen item. Yet, the results of the current study were consistent with findings using other approaches – choice indication (for example Clement, Aastrup and Charlotte Forsberg, 2015) and purchase intention rating (Behe et al., 2013). Thus, indicating that the difference in the experimental procedure between these studies did not influence the research findings.

Additionally, the current project also demonstrated the validity of using goal assignment as an experimental procedure. Prior research on the influence of goals on visual attention recruited consumers and assigned them into groups with different goals, with an exception of Harwood and Jones (2014). The current project aimed to use the goals consumers already had at venue entry to split them into groups. The usage of the goals consumers actually had ought to result in a measurement with a better face validity as the goals are relevant to consumers. Yet, the results of the current project demonstrated similar results to those that assigned tasks to respondents both in laboratory (for example Chandon et al., 2009) and other real-life settings (such as Wästlund et al., 2015). Thus adding further validity to the research approach of assigning respondents into groups, by reaching similar results using a method with greater face validity.

4.2.2. IMPLICATIONS FOR PRACTICE

Taken together the results of the hypotheses studied in the current project provide a range of implications for practitioners of the pub and beer trade – outlet managers and brand owners. The following sections outline possible strategic ideas that the practitioners can implement to optimise their businesses.

4.2.2.1. *PUB MANAGERS AND OWNERS*

Implications of current findings suggest ways in which pub owners can optimise their beer offering to better satisfy their customers, encourage repeat visits and achieve greater sales.

The connection between visual attention and familiarity suggests ways in which pub managers can deliver better experience to their customers. The venue owners are likely to be aware of the segments of customers frequenting their venue, which is often driven by a geographical location of the pub. For example, a remote village pub is likely to be visited by regular consumers whereas a city centre pub is more frequented by tourists and new visitors.

The results indicated that familiar visitors notice fewer products at the point of purchase than first time visitors. This notion implies that familiar visitors, those that repeatedly visit the venue, are less visually inquisitive which therefore increases the chances of them not scanning the whole scene and finding the product that satisfies their needs. To address this, the venue managers can occasionally rearrange the order of the brands at the point of purchase therefore disrupting the usual visual browsing patterns of shoppers, increasing the likelihood that they will notice other brands or decide to try something new. The practice is often used in supermarkets to encourage cross category purchases. Although in the supermarket context the practice has received some criticism as consumers negatively respond to not being able to locate a product they need (Reid and Brown, 1996). However, this issue is minimised in a pub setting as the consumers can just place an order without the need to examine the scene. Thus, allowing an opportunity for some visitors to explore new products and minimizing the disruption for those who wish to purchase their intended product.

The results also indicated that consumers who enter a pub with a specific brand in mind scanned fewer brands and were more likely to exhibit habitual behaviour of ordering the same product. Also, consumers who have ever been to the venue are more likely to have a specific goal. Thus, implying that the regular visitors in pubs are more likely to enter the venue with a specific brand in mind. The tactic of moving the brands at the bar is also likely to influence visual attention patterns of consumers with a specific goal and encourage them to browse the point of purchase. Additionally, the pub venues could try to encourage bar staff to provide suggestions to the regular visitors to entice them to try new products. These recommendations could induce this group to break out of their habit, potentially leading to even more satisfaction in case they discover a product they prefer more. Furthermore, the attention received and the service is likely to cause consumers to positively evaluate the venue. These suggestions could help to break through and challenge regular consumers' habits, allowing them to discover new products they prefer more.

The results also showed that some consumers make choices without ever looking at the pump clips at the point of purchase. The highest proportion of these consumers were first time visitors. Therefore, it is likely that staff recommendations or suggestions played some role in shaping visual attention and choices made by consumers. This finding highlights the importance of bar staff training and their ability to provide accurate recommendations or encourage product trial. As in the case of consumer dissatisfaction, they are likely to be disappointed not just with their product but also with the venue itself.

The results of the current study also showed that consumers' capacity for visual attention is quite limited, which has important implications for venues' product range and assortment. Given on average 17.3 pump clips in the studied venues, consumers paid attention to only 7.48 of them, or 44%. Of an average of 12.3 brands at the bar in each venue, 55% of choices were made by looking at fewer than four items. This finding implies that it may not always be necessary to carry a large product portfolio. Stocking a wider selection of products and providing a wider assortment is associated with higher costs because of procurement, the need to store and dispose of the products unsold within their best before date. As a result, it is crucial to understand whether carrying a larger portfolio of products adds value to the pub offering. The results of the current project indicate that unless wide brand availability a key choice criteria of the venue, the management could reconsider the number of products they stock, reducing it in the cases the venue provides a large offer. Apart from direct cost savings that this suggestion entails, fewer options may positively influence the choice process of consumers as large assortments tend to overwhelm shoppers (Greifeneder, Scheibehenne and Kleber, 2010). Previous research has shown that retailers can increase their profitability by optimising their range; the rise and success of limited assortment retailers such as ALDI shows that consumers respond favourably to reduced choices (Oppewal and Koelemeijer, 2005).

4.2.2.2. *BRAND MANAGERS*

As the current research project was conducted in a pub environment, the implications predominantly relate to pub managers. Nonetheless, some of the results may be useful to brand managers who design and produce beers, as well as other visual aspects of brands that are considered at the point of purchase.

The finding of the current project that a greater familiarity with a pub environment reduces shoppers' visual attention to the brands at the point of purchase has an implication for a new product launch strategies carried out by the brand owners. This

notion indicates that brand owners can launch new products in venues that are frequented by first time or unfamiliar visitors in order to maximise the chance that their products are seen and subsequently chosen. Such venues include city centre venues known for their high proportion of tourists or other categories of infrequent visitors. Additionally, brand owners can encourage bar staff to recommend their products to consumers who may like them. Although pub owners may consider it a good service to recommend “a pint of the usual” to their regular visitors, in doing so they are encouraging them not to scan the visual scene and thus not to discover new products. As a result, brand owners need to work harder to disrupt the habitual visual behaviour of consumers and attract their visual attention.

Additionally, brand owners may need to rely on attracting consumers who favour other brands in order to grow the market share of their business. As the beer market is expected to see an average growth of 1.12% over the next five years, there will be limited opportunities to attract new shoppers (Mintel, 2019). This makes it crucial to design visually salient product packaging to attract the visual attention of shoppers favouring competing products and to develop an understanding of how their own visual branding performs against competitors’.

The results demonstrated that consumers who have a specific brand in mind at pub entry look less at other brands at the point of purchase, thus highlighting the importance of out-of-store marketing. These results demonstrate the advantage held by established and well-known brands and suggest that when a consumer comes in to purchase a specific brand, they are less likely to examine other competing brands and thus less likely to switch, reinforcing the stand of the established brand. As a result, brand owners should consider their out-of-store marketing efforts to ensure that customers have enough memory equity to enter the venue with a specific product in mind. As some consumers never look at the point of purchase, it is less likely that competing products will grab their attention and encourage them to switch.

The findings of the current project demonstrated the importance of making packaging visually salient. The results indicated that 55% of the chosen products were noticed at most fourth out of on average 12.3 brands at the point of purchase. These results demonstrate the importance of ensuring that the customers note the brand earlier during their journey. A combination of low-level features such as colours, brightness and shapes may be useful when brand owners design their pump clips. Brand owners need to make sure that the products they create – in the case of the current research, the pump clips they design – are visually salient.

Furthermore, the current project revealed that consumers look at chosen items differently – they tend to look at them longer and re-examine them more. This highlights the importance of ensuring that the information needed for consumers to make a choice is present at the beer pump clips. It is crucial for brand owners to ensure that their pump clips are visually salient and communicate task-relevant information to potential buyers.

4.3. LIMITATIONS

The current section outlines a range of limitations arising from the stimuli, procedure and data analysis of the study. Although the main contribution of the current project derives from its real-life research setting, this also resulted in a range of limitations. Data collection was undertaken predominantly in the late afternoon to avoid busy periods (the actual dates and times were directed by the venue managers). However, in some cases this did not completely eliminate the need for participants to queue. Although waiting to be served is part of the real ordering process, it might have encouraged some consumers to look more at the point of purchase. Data collection was carried out a few times a week, over multiple weeks. As some products such as cask ale have a shelf life of around three days, some real ale brands were replaced with new brands during the period of the study. This change, although affecting only a few pump clips, means that the scene has not been identical for all respondents throughout the study.

Additionally, the data were gathered in three venues in two cities (London and Cambridge). This limited the ability to generalise the findings to other geographic locations. The study also featured a self-selecting convenience sample of a young demographic (20 – 40 years old), preventing generalisation to other age groups. All of the participants recruited to the study had made the decision to visit the venue and to purchase beer. However, they received a financial incentive for taking part in the research, which may have influenced their product choices. For example, they may have opted for more premium products.

The participants were recruited outside the venue where possible. However, only one venue had seating outside, making it impossible to set out the equipment and recruit participants before they entered the pub. If recruited inside the venue, potential respondents were asked to take part in the study as soon as they entered the venue and were encouraged to look at the researcher and away from the bar. Nonetheless, it is possible that just glancing at the pub environment for a few seconds before being

recruited to the study familiarised participants with the general venue environment, thus eliminating the differences between consumers with different levels of familiarity.

This study did not measure whether the respondents came to the venue alone or as a part of a group. In some cases, a single respondent from a group took part in the experiment, whereas in other cases a group of visitors expressed the desire to take part. Therefore, participants who approached the bar with someone they knew may have behaved differently than those who approached the bar alone.

The current project used beer pump clips as stimuli, as they are a consistently present and visually prominent product in a pub. However, pump clips differ from other products on some dimensions – they are of a limited size, are placed in a specific place (at the bar), they cannot be picked up by consumers for further examination. These differences make it hard to generalise the findings to other product categories such as, for example, bottled beers in a fridge or at the back of bar. Additionally, participant recruitment requirement was an intention to purchase beer. Some respondents scanned the pump clips, but bought a beer from the fridge, which was outside of the scope of the current project. These respondents were excluded from the metrics that studied visual attention and choice, thus reducing the number of possible observations.

Furthermore, the analysis could have had an influence on the results. First of all, the visual attention data were coded by one person. Although great effort was made to follow a consistent protocol and the definition of fixations was checked at least twice, this might have resulted in unintentional errors. Additionally, to investigate visual attention to the pub environment, the venue was split into a range of areas of interest depending on their content and location. However, it is possible that a different definition of the areas of interest could provide a different set of results.

The visual attention metrics chosen in the current project were meant to capture different aspects of the visual attention process. However, the literature review has demonstrated that metrics have a dramatic influence on the outcomes of such research. The metrics used in the current project aimed to assess multiple elements of visual attention, yet it is possible that a different set of metrics could have influenced the research outcomes. Additionally, although fixations are needed to process the information, pump clips are placed relatively close to each other at the point of purchase. As a result, it is possible that consumers recognised some brands using their peripheral vision and thus never looked at them, reducing the amount of attention to some products. The findings also highlighted that earlier noticed items are chosen more. Although this notion implies causation, it is also possible that in some instances

consumers were looking for specific brands, which made those brands more visually salient and increased the efficiency of their search.

Lastly, as the current project aimed to assess how specific top-down factors influence visual attention, it did not take into account the bottom-up influencers of visual attention. Therefore, the study cannot provide any details of the specific characteristics of the environment that draw consumers' visual attention. In addition, the study did not control for other top-down factors, such as familiarity with a chosen brand, that may influence consumers' visual attention.

4.4. FUTURE RESEARCH

The methodology, results and implications of the current project provide a range of suggestions for future research. The current project aimed to examine visual attention in a novel, real-life environment – a pub. Future research should be done to investigate the visual behaviour of consumers in other types of shopping environments such as coffee shops and fast food chains to examine whether the findings of the current study can be generalised to other retail environments. The examination of additional settings should provide further insights into whether the visual attention of shoppers is consistent or different across settings in order to increase the external validity of the results of the current project. Other product categories within a pub environment should also be examined to assess whether generalisation is possible from beer pump clips to other product categories. More research should also be carried out in other geographic regions and featuring participants of different ages to assess whether these findings can be expanded to other geographic locations and consumers.

One of the unique characteristics of a pub compared with a typical supermarket is the presence of a service element, with bar staff to take orders or offer advice. The interaction of bar staff and participants was beyond the scope of the current project, but the results provided some indications that staff suggestions may have an important influence on customers' visual attention and choices. The results of the current project showed that 15% of the respondents never looked at the products on offer before making a choice. These respondents were probably offered recommendations or suggestions by the bar staff that they agreed with. Although staff members are present in a supermarket environment, they are not an integral part of customers' choice process and thus play a less important role in the process. Therefore, future research is needed to investigate how bar staff – people who are likely to be viewed as in a position of authority in a pub – influence the visual attention and decisions of consumers. In future investigations, the influence of sheer staff presence in a shopping

environment on visual attention should be investigated, as it could also have an influence on the visual attention and behaviour of shoppers.

The results of the current project did not indicate that venue familiarity influences consumers' visual attention to the in-store shopping environment. The finding may be due to the specifics of the venues chosen in this study or the elements of the data analysis. Future work should be carried out to approach the research question with a different methodology, perhaps using different means of defining areas of interest, allowing for a more systematic measurement of visual attention across the venues. Additionally, research could focus on specific areas of interest, such as promotional posters and materials, and how they influence visual attention and subsequent choices of respondents. Regular consumers may notice a new marketing stimulus in a familiar environment that could shape their behaviour.

Additionally, as significant differences were observed between consumers with different familiarity levels and the amounts of visual attention they paid to the products at the point of purchase (but not throughout their whole shopping journey), it is likely that the influence of familiarity on visual attention differs between stages of consumers' shopping journey. Future studies should investigate this issue further and examine how familiarity influences visual attention at different stages of the shopper journey. In addition, the research could investigate and identify the stages of a whole customer journey – from store entry to completion of the purchase.

Future research should also examine how other situational variables such as consumer's choice of venue and who they are visiting it with influence visual attention. It is possible that consumers visiting a venue in a group could be affected by their peers.

The current project focused on top-down influencers of visual attention. Researchers should also examine how the bottom-up features of products influence visual attention in non-supermarket shopping environments. Variables such as size, colour, number of facings and position could be investigated to assess whether the findings of research conducted in real supermarkets can be generalised to other settings. Other top-down factors should also be examined in real environments, such as demographics or involvement.

The study examined how familiarity and goals, both top-down factors, influence visual attention, and separately how visual attention influences choice. In this relationship, visual attention is likely to mediate the relationship between top-down and bottom-up factors and choice. Thus, future research should examine the extent to which visual

attention mediates top-down factors and choice. Perhaps consumers are drawn to specific, more informative elements of pump clips or notice certain colours or shapes more.

The research showed that on average, consumers only scanned 44% of the products on offer. Although the current research project did not specifically look at the position of products at the bar, prior research has shown that, for example, items in a middle of an array tend to attract more visual attention and are chosen more (Atalay, Bodur and Rasolofoarison, 2012). Therefore, future studies should examine whether certain horizontal positions attract more visual attention. Perhaps products in the centre or those located closer to the entrance (making consumers more likely to notice them as they approach the bar) receive more visual attention than those at the opposite end. By understanding which locations receive the most visual attention and which products generate the most sales, pub owners can rethink the positioning of products at the bar.

The results demonstrated that consumers tend to look at the chosen product more and make more re-visits to it. Future research should investigate what types of information consumers look for when making a choice. Their visual attention and the information needed may also vary depending on the level of their expertise and familiarity with the products.

The finding of the current project showed that consumers tended to choose earlier noted products. This was probably because consumers were primed by the items they saw earlier, making those products more accessible in memory and resulting in subsequent choices. The current study did not assess how consumers felt about their chosen products, but their attitude toward them may have been improved through the mere exposure effect, as they tended to notice them earlier and return more to them. Future studies to test these observations are therefore recommended.

The examination of the visual behaviour of respondents in the current study provided some preliminary evidence that consumers opt for a more satisficing rather than rational decision-making when shopping in a real pub. More research is needed to investigate whether consumers settle for an item that is just good enough – therefore denying themselves a better choice – or whether consumers are actually satisfied with their item or believe there is a better choice that they have not considered.

Lastly, the research found that consumers who had visited the venue before were more likely to have a specific product in mind that they wanted to purchase. Subsequent research should examine whether regular consumers tend to purchase similar products during their repeated visits.

5. CONCLUSIONS

Prior research studying the visual attention of shoppers in real-life shopping environments is limited. Relevant experiments have predominantly been carried out in supermarkets, with a few exceptions examining department stores, sports stores and gas station stores. Yet shoppers frequent a range of other types of retail environments – restaurants, coffee shops, pubs, etc. – all of which are characterised by unique features, such as the presence of a service element and the inability to evaluate the product until after placing an order. These features may influence the visual attention of shoppers, which has not yet been addressed in the literature. The current project aimed to address this gap by investigating the visual attention of shoppers in a novel retail environment – a pub. More specifically, the study examined how familiarity with the venue and consumer goals, both top-down factors, influence the visual attention of consumers to pump clips at the point of purchase. The relationship between visual attention and brand choice was also investigated.

To achieve the aim of the study, the visual attention of beer-intended pub visitors was recorded using eye-tracking glasses. A large sample of 178 people was recruited on pub entry in three pubs (two in London and one in Cambridge), who were asked to fill in a brief questionnaire and carry out their planned purchases while wearing the equipment. The resulting data were used to investigate the influence of venue familiarity and goals on visual attention, and the link between visual attention and choice.

The results demonstrated that greater familiarity with a pub had no influence on the visual attention of shoppers to its environment. Regardless of their level of familiarity, consumers looked at a similar proportion of areas of interest and made a similar number of visits to the studied AOIs. However, increased familiarity with a pub reduced visual attention to the products at the point of purchase. Regular visitors saw fewer pump clips and spent less time looking at the brands and at the chosen items. The current study expanded knowledge of the influence of store familiarity on visual attention to the retail environment as well as its elements. The findings also highlighted that the effect of familiarity on visual attention differs between the stages of consumer decision-making.

Additionally, the study showed that goal specificity reduced consumers' visual attention to products at the point of purchase. Consumers with a specific goal looked at fewer pump clips, spent less time looking at the brands, made fewer fixations before noting

the chosen product and looked less at the eventually chosen product. This finding expands understanding of how goal types influence the visual attention of consumers and demonstrates that having a specific goal makes the visual attention of consumers more focused.

Lastly, the findings indicated that the chosen brands were looked at less and received fewer visits. It was also noted that earlier noticed brands had a greater likelihood of being chosen. These results demonstrate the relationship between visual attention and choice in a novel retail environment. In addition, early visual attention appeared to positively influence consumer choices.

To summarise, the current project has done the following. (1) Examined the visual attention of consumers in a novel retail environment, a pub. (2) Demonstrated that greater familiarity with the environment does not influence visual attention to it, but does reduce visual attention to products at the point of purchase. (3) Showed that goal specificity reduces visual attention to brands at the bar. (4) Highlighted that greater visual attention is associated with a higher choice likelihood.

6. REFERENCES

- Aarts, H. and Dijksterhuis, A., 2000. Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology*, [e-journal] 78(1), pp.53–63. <https://doi.org/10.1037/0022-3514.78.1.53>.
- Abratt, R. and Goodey, S.D., 1990. Unplanned buying and in-store stimuli in supermarkets. *Managerial and Decision Economics*, [e-journal] 11(2), pp.111–121. <https://doi.org/10.1002/mde.4090110204>.
- Alba, J.W. and Hutchinson, J.W., 1987. Dimensions of Consumer Expertise. *Journal of Consumer Research*, [e-journal] 13(4), pp.411–454. <https://doi.org/10.1086/209080>.
- Alba, J.W., Hutchinson, J.W. and Lynch, J.G.J., 1991. Memory and Decision Making. In: T.S. Robertson and H.H. Kassarian, eds. 1991. *Handbook of consumer behavior*. Englewood Cliffs, N.J.: Prentice-Hall. Ch.1.
- Andrews, R.L. and Srinivasan, T.C., 1995. Studying Consideration Effects in Empirical Choice Models Using Scanner Panel Data. *Journal of Marketing Research*, [e-journal] 32(1), pp.30–41. <http://journals.sagepub.com/doi/10.1177/002224379503200105>.
- Ares, G., Giménez, A., Bruzzone, F., Vidal, L., Antúnez, L. and Maiche, A., 2013. Consumer Visual Processing of Food Labels: Results from an Eye-Tracking Study. *Journal of Sensory Studies*, [e-journal] 28(2), pp.138–153. <https://doi.org/10.1111/joss.12031>.
- Atalay, A.S., Bodur, H.O. and Rasolofoarison, D., 2012. Shining in the Center: Central Gaze Cascade Effect on Product Choice. *Journal of Consumer Research*, [e-journal] 39(4), pp.848–866. <https://doi.org/10.1086/665984>.
- Austin, J.T. and Vancouver, J.B., 1996. Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin*, [e-journal] 120(3), pp.338–375. <https://doi.org/10.1037/0033-2909.120.3.338>.
- Bagozzi, R.P. and Dholakia, U., 1999. Goal Setting and Goal Striving in Consumer Behavior. *Journal of Marketing*, [e-journal] 63(Special Issue 1999), pp.19–32. <https://doi.org/10.1177/00222429990634s104>.

- Baker, J., 1986. The role of the environment in marketing services: the consumer perspective. In: J.A. Czepiel, C.A. Congram and J. Shanahan, eds. 1987. *The Services challenge: integrating for competitive advantage*. Chicago, IL: American Marketing Association. pp.79–84.
- Baker, J., Grewal, D. and Parasuraman, A., 1994. The Influence of Store Environment on Quality Inferences and Store Image. *Journal of the Academy of Marketing Science*, [e-journal] 22(4), pp.328–339. <https://doi.org/10.1177/0092070394224002>.
- Banović, M., Rosa, P.J. and Gamito, P.S.P., 2014. Eye of the Beholder: Visual Search, Attention and Product Choice. In: P.S.P. Gamito, P.J. Rosa, eds. 2014. *I see me, you see me: inferring cognitive and emotional processes from gazing behaviour*. Newcastle upon Tyne: Cambridge Scholars Publishing. Ch.3.
- Baumgartner, H. and Pieters, R., 2008. Goal-Directed Consumer Behaviour. In: C.P. Haugtvedt, P.M. Herr and F.R. Kardes, eds. 2008. *Handbook of consumer psychology*. New York, NY: Lawrence Erlbaum Associates. Ch.13.
- Behe, B.K., Bae, M., Huddleston, P.T. and Sage, L., 2015. The effect of involvement on visual attention and product choice. *Journal of Retailing and Consumer Services*, [e-journal] 24, pp.10–21. <https://doi.org/10.1016/j.jretconser.2015.01.002>.
- Behe, B.K., Zhao, J., Sage, L., Huddleston, P.T. and Minahan, S., 2013. Display signs and involvement: the visual path to purchase intention. *The International Review of Retail, Distribution and Consumer Research*, [e-journal] 23(5), pp.511–522. <https://doi.org/10.1080/09593969.2013.832695>.
- Bemmaor, A.C. and Mouchoux, D., 1991. Measuring the Short-Term Effect of In-Store Promotion and Retail Advertising on Brand Sales: A Factorial Experiment. *Journal of Marketing Research*, [e-journal] 28(2), pp.202–214. <https://doi.org/10.2307/3172808>.
- Biederman, I., Mezzanotte, R.J. and Rabinowitz, J.C., 1982. Scene perception: Detecting and judging objects undergoing relational violations. *Cognitive Psychology*, [e-journal] 14(2), pp.143–177. [https://doi.org/10.1016/0010-0285\(82\)90007-X](https://doi.org/10.1016/0010-0285(82)90007-X).
- Biehal, G. and Chakravarti, D., 1983. Information Accessibility as a Moderator of Consumer Choice. *Journal of Consumer Research*, [e-journal] 10(1), pp.1–14. <https://doi.org/10.1086/208941>.
- Blackwell, R.D., Miniard, P.W. and Engel, J.F., 2006. *Consumer behavior*. Mason, OH: Thomson/South-Western.

- Blumberg, B.F., Cooper, D.R. and Schindler, P.S., 2014. *Business research methods*. 4th ed. Maidenhead: McGraw-Hill Education.
- Bornstein, R.F. and D'Agostino, P.R., 1992. Stimulus Recognition and the Mere Exposure Effect. *Journal of Personality and Social Psychology*, [e-journal] 63(4), pp.545–552. <http://dx.doi.org/10.1037/0022-3514.63.4.545>.
- Bryman, A. and Bell, E., 2015. *Business research methods*. 4th ed. Oxford: Oxford University Press.
- Brysbaert, M., 2011. *Basic statistics for psychologists*. Houndmills: Palgrave Macmillan.
- Bundesen, C., 1987. Visual attention: Race models for selection from multielement displays. *Psychological Research*, [e-journal] 49(2–3), pp.113–121. <https://doi.org/10.1007/BF00308676>.
- Bundesen, C., 1990. A theory of visual attention. *Psychological Review*, [e-journal] 97(4), pp.523–547. <https://doi.org/10.1037/0033-295X.97.4.523>.
- Buttle, F., 1984. Retail Space Allocation. *International Journal of Physical Distribution & Materials Management*, [e-journal] 14(4), pp.3–23. <https://doi.org/10.1108/eb014588>.
- Campbell, B.A. and Raskin, L.A., 1978. Ontogeny of behavioral arousal: The role of environmental stimuli. *Journal of Comparative and Physiological Psychology*, [e-journal] 92(1), pp.176–184. <http://doi.org/10.1037/h0077423>.
- Chandon, P., Hutchinson, J.W., Bradlow, E.T. and Young, S.H., 2009. Does In-Store Marketing Work? Effects of the Number and Position of Shelf Facings on Brand Attention and Evaluation at the Point of Purchase. *Journal of Marketing*, [e-journal] 73(6), pp.1–17. <https://doi.org/10.1509/jmkg.73.6.1>.
- Chandon, P., Hutchinson, J.W., Bradlow, E.T. and Young, S.H., 2008. Measuring the Value of Point-of-Purchase Marketing with Commercial Eye-Tracking Data. In: M. Wedel and R. Pieters, eds. 2008. *Visual marketing: From attention to action*. New York, NY: Lawrence Erlbaum Associates. Ch.10.
- Chevalier, M., 1975. Increase in Sales Due to In-Store Display. *Journal of Marketing Research*, [e-journal] 12(4), pp.426–431. <https://doi.org/10.1177/002224377501200406>.
- Cialdini, R.B. and Goldstein, N.J., 2004. Social Influence: Compliance and Conformity. *Annual Review of Psychology*, [e-journal] 55(1), pp.591–621. <https://doi.org/10.1146/annurev.psych.55.090902.142015>.

- Clement, J., 2007. Visual influence on in-store buying decisions: an eye-track experiment on the visual influence of packaging design. *Journal of Marketing Management*, [e-journal] 23(9–10), pp.917–928.
<https://doi.org/10.1362/026725707X250395>.
- Clement, J., Aastrup, J. and Charlotte Forsberg, S., 2015. Decisive visual saliency and consumers' in-store decisions. *Journal of Retailing and Consumer Services*, [e-journal] 22, pp.187–194. <https://doi.org/10.1016/j.jretconser.2014.09.002>.
- Clement, J., Kristensen, T. and Grønhaug, K., 2013. Understanding consumers' in-store visual perception: The influence of package design features on visual attention. *Journal of Retailing and Consumer Services*, [e-journal] 20(2), pp.234–239.
<https://doi.org/10.1016/j.jretconser.2013.01.003>.
- Collis, J. and Hussey, R., 2014. *Business research: a practical guide for undergraduate & postgraduate students*. 4th ed. Houndmills: Palgrave Macmillan.
- Corstjens, M. and Doyle, P., 1981. A Model for Optimizing Retail Space Allocations. *Management Science*, [e-journal] 27(7), pp.822–833.
<https://doi.org/10.1287/mnsc.27.7.822>.
- Crotty, M., 1998. *The foundations of social research: meaning and perspective in the research process*. London: Sage Publications.
- Danner, L., de Antoni, N., Gere, A., Sipos, L., Kovács, S. and Dürschmid, K., 2016. Make a choice! Visual attention and choice behaviour in multialternative food choice situations. *Acta Alimentaria*, [e-journal] 45(4), pp.515–524.
<https://doi.org/10.1556/066.2016.1111>.
- Denscombe, M., 2010. *Ground rules for social research: guidelines for good practice*. 2nd ed. Maidenhead: Open University Press/McGraw-Hill.
- Dodge, R., 1906. Recent studies in the correlation of eye movement and visual perception. *Psychological Bulletin*, [e-journal] 3(3), pp.85–92.
<http://dx.doi.org/10.1037/h0071225>.
- Dogu, U. and Erkip, F., 2000. Spatial Factors Affecting Wayfinding and Orientation. *Environment and Behavior*, [e-journal] 32(6), pp.731–755.
<https://doi.org/10.1177/00139160021972775>.
- Donovan, R.J. and Rossiter, J.R., 1982. Store Atmosphere: An Environmental Psychology Approach. *Journal of Retailing*, [e-journal] 58(1), pp.34–57. Available through: Anglia Ruskin University Library website [Accessed 10 November 2018].

- Drèze, X. and Hussherr, F.-X., 2003. Internet advertising: Is anybody watching? *Journal of Interactive Marketing*, [e-journal] 17(4), pp.8–23. <https://doi.org/10.1002/dir.10063>.
- Duchowski, A.T., 2007. *Eye Tracking Methodology*. 2nd ed. London: Springer.
- Easterby-Smith, M., Thorpe, R., Jackson, P. and Jaspersen, L.J., 2018. *Management & business research*. 6th ed. London: Sage Publications.
- Fischer, B. and Weber, H., 1993. Express saccades and visual attention. *Behavioral and Brain Sciences*, [e-journal] 16(3), pp.553–567. <https://doi.org/10.1017/S0140525X00031575>.
- Gidlöf, K., Anikin, A., Lingonblad, M. and Wallin, A., 2017. Looking is buying. How visual attention and choice are affected by consumer preferences and properties of the supermarket shelf. *Appetite*, [e-journal] 116, pp.29–38. <https://doi.org/10.1016/j.appet.2017.04.020>.
- Gigerenzer, G., 2008. Why Heuristics Work. *Perspectives on Psychological Science*, [e-journal] 3(1), pp.20–29. <https://doi.org/10.1111/j.1745-6916.2008.00058.x>.
- Goldberg, J.H., Probart, C.K. and Zak, R.E., 1999. Visual Search of Food Nutrition Labels. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, [e-journal] 41(3), pp.425–437. <https://doi.org/10.1518/001872099779611021>.
- Gollwitzer, P.M. and Brandstätter, V., 1997. Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, [e-journal] 73(1), pp.186–199. <http://dx.doi.org/10.1037/0022-3514.73.1.186>.
- Grant, A.M. and Wall, T.D., 2009. The Neglected Science and Art of Quasi-Experimentation: Why-to, When-to, and How-to Advice for Organizational Researchers. *Organizational Research Methods*, [e-journal] 12(4), pp.653–686. <https://doi.org/10.1177/1094428108320737>.
- Gray, D.E., 2014. *Doing research in the real world*. 3rd ed. London: Sage Publications.
- Greifeneder, R., Scheibehenne, B. and Kleber, N., 2010. Less may be more when choosing is difficult: Choice complexity and too much choice. *Acta Psychologica*, [e-journal] 133(1), pp.45–50. <http://dx.doi.org/10.1016/j.actpsy.2009.08.005>.
- Guadagni, P.M. and Little, J.D.C., 1983. A Logit Model of Brand Choice Calibrated on Scanner Data. *Marketing Science*, [e-journal] 2(3), pp.203–238. <https://doi.org/10.1287/mksc.2.3.203>.

- Hair Jr., J.F., Celsi, M., Money, A., Samouel, P. and Page, M., 2016. *Essentials of business research methods*. 3rd ed. Abingdon: Routledge.
- Harwood, T. and Jones, M., 2014. Mobile Eye-Tracking in Retail Research. In: M. Horsley, M. Eliot, B.A. Knight and R. Reilly, eds. 2014. *Current Trends in Eye Tracking Research*. pp.183–199.
- Hecht, E., 2002. *Optics*. 4th ed. London: Addison-Wesley.
- Hendrickson, K. and Ailawadi, K.L., 2014. Six Lessons for In-Store Marketing from Six Years of Mobile Eye-Tracking Research. In: D. Grewal, A. L. Roggeveen and J. Nordfält, eds. 2014. *Shopper Marketing and the Role of In-Store Marketing (Volume 11)*. Bingley: Emerald Group Publishing Limited. pp.57–74.
- Higgins, E., Leinenger, M. and Rayner, K., 2014. Eye movements when viewing advertisements. *Frontiers in Psychology*, [e-journal] 5, pp.1–15.
<https://doi.org/10.3389/fpsyg.2014.00210>.
- Hoch, S.J. and Deighton, J., 1989. Managing What Consumers Learn from Experience. *Journal of Marketing*, [e-journal] 53(2), pp.1–20. <http://dx.doi.org/10.2307/1251410>.
- Holden, S.J.S. and Vanhuele, M., 1999. Know the name, forget the exposure: Brand familiarity versus memory of exposure context. *Psychology and Marketing*, [e-journal] 16(6), pp.479–496. [https://doi.org/10.1002/\(SICI\)1520-6793\(199909\)16:6<479::AID-MAR3>3.0.CO;2-Y](https://doi.org/10.1002/(SICI)1520-6793(199909)16:6<479::AID-MAR3>3.0.CO;2-Y).
- Holmqvist, K., Nyström, M., Andersson, R., Dewhurst, R., Jarodzka, H. and Van De Weijer, J., 2011. *Eye tracking. A comprehensive guide to methods and measures*. Oxford: Oxford University Press.
- Howitt, D. and Cramer, D., 2017. *Research methods in psychology*. 5th ed. Harlow: Pearson.
- Huddleston, P., Behe, B.K., Minahan, S. and Fernandez, R.T., 2015. Seeking attention: an eye tracking study of in-store merchandise displays. *International Journal of Retail & Distribution Management*, [e-journal] 43(6), pp.561–574.
<https://doi.org/10.1108/IJRDM-06-2013-0120>.
- Huddleston, P.T., Behe, B.K., Driesener, C. and Minahan, S., 2018. Inside-outside: Using eye-tracking to investigate search-choice processes in the retail environment. *Journal of Retailing and Consumer Services*, [e-journal] 43(July), pp.85–93.
<https://doi.org/10.1016/j.jretconser.2018.03.006>.

- Hutchinson, J.W. and Eisenstein, E.M., 2008. Consumer Learning and Expertise. In: C.P. Haugtvedt, P.M. Herr and F.R. Kardes, eds. 2008. *Handbook of consumer psychology*. New York, NY: Lawrence Erlbaum Associates. Ch.4.
- Inman, J.J., Winer, R.S. and Ferraro, R., 2009. The Interplay Among Category Characteristics, Customer Characteristics, and Customer Activities on In-Store Decision Making. *Journal of Marketing*, [e-journal] 73(5), pp.19–29. <https://doi.org/10.1509%2Fjmk.73.5.19>.
- Itti, L. and Koch, C., 2000. A saliency-based search mechanism for overt and covert shifts of visual attention. *Vision Research*, [e-journal] 40(10–12), pp.1489–1506. [https://doi.org/10.1016/S0042-6989\(99\)00163-7](https://doi.org/10.1016/S0042-6989(99)00163-7).
- Itti, L., Koch, C. and Niebur, E., 1998. A model of saliency-based visual attention for rapid scene analysis. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, [e-journal] 20(11), pp.1254–1259. <https://doi.org/10.1109/34.730558>.
- Janiszewski, C., 1998. The Influence of Display Characteristics on Visual Exploratory Search Behavior. *Journal of Consumer Research*, [e-journal] 25(3), pp.290–301. <https://doi.org/10.1086/209540>.
- Janiszewski, C., 2002. Preattentive Mere Exposure Effects. *Journal of Consumer Research*, [e-journal] 20(3), pp.376–392. <https://doi.org/10.1086/209356>.
- Jantathai, S., Danner, L., Joechl, M. and Dürschmid, K., 2013. Gazing behavior, choice and color of food: Does gazing behavior predict choice? *Food Research International*, [e-journal] 54(2), pp.1621–1626. <https://doi.org/10.1016/j.foodres.2013.09.050>.
- Kent, R.J. and Allen, C.T., 1994. Competitive Interference Effects in Consumer Memory for Advertising: The Role of Brand Familiarity. *Journal of Marketing*, [e-journal] 58(3), pp. 97–105. <http://dx.doi.org/10.2307/1252313>.
- Kim, E., Tang, L.R., Meusel, C. and Gupta, M., 2018. Optimization of menu-labeling formats to drive healthy dining: An eye tracking study. *International Journal of Hospitality Management*, [e-journal] 70, pp.37–48. <https://doi.org/10.1016/j.ijhm.2017.10.020>.
- Kleingeld, A., Van Mierlo, H. and Arends, L., 2011. The effect of goal setting on group performance: A meta-analysis. *Journal of Applied Psychology*, [e-journal] 96(6), pp.1289–1304. <https://doi.org/10.1037/a0024315>.

- Krajbich, I., Armel, C. and Rangel, A., 2010. Visual fixations and the computation and comparison of value in simple choice. *Nature Neuroscience*, [e-journal] 13(10), pp.1292–1298. <https://doi.org/10.1038/nn.2635>.
- Krugman, D.M., Fox, R.J., Fletcher, J.E., Fischer, P.M. and Rojas, T.H., 1994. Do Adolescents Attend to Warnings in Cigarette Advertising? An Eye-Tracking Approach. *Journal of Advertising Research*, [e-journal] 34(6), pp.39–52. Available through: Anglia Ruskin University Library website [Accessed 1 November 2018].
- Kushwaha, T. and Shankar, V., 2013. Are Multichannel Customers Really more Valuable? The Moderating Role of Product Category Characteristics. *Journal of Marketing*, [e-journal] 77(4), pp.67–85. <https://doi.org/10.1509/jm.11.0297>.
- Land, M.F. and Hayhoe, M., 2001. In what ways do eye movements contribute to everyday activities? *Vision Research*, [e-journal] 41(25–26), pp.3559–3565. [https://doi.org/10.1016/S0042-6989\(01\)00102-X](https://doi.org/10.1016/S0042-6989(01)00102-X).
- Land, M.F., 2007. Fixation strategies during active behaviour: a brief history. In: R.P.G. Van Gompel, M.H. Fischer, W.S. Murray and R.L. Hill, eds. 2007. *Eye movements: a window on mind and brain*. Oxford: Elsevier. Ch.4.
- Laroche, M., Kim, C. and Zhou, L., 1996. Brand familiarity and confidence as determinants of purchase intention: An empirical test in a multiple brand context. *Journal of Business Research*, [e-journal] 37(2), pp.115–120. [https://doi.org/10.1016/0148-2963\(96\)00056-2](https://doi.org/10.1016/0148-2963(96)00056-2).
- Latham, G.P. and Locke, E.A., 1975. Increasing productivity and decreasing time limits: A field replication of Parkinson's law. *Journal of Applied Psychology*, [e-journal] 60(4), pp.524–526. <http://dx.doi.org/10.1037/h0076916>.
- Latham, G.P. and Locke, E.A., 1991. Self-regulation through goal setting. *Organizational Behavior and Human Decision Processes*, [e-journal] 50(2), pp.212–247. [https://doi.org/10.1016/0749-5978\(91\)90021-K](https://doi.org/10.1016/0749-5978(91)90021-K).
- Latham, G.P. and Yukl, G.A., 1976. Effects of assigned and participative goal setting on performance and job satisfaction. *Journal of Applied Psychology*, [e-journal] 61(2), pp.166–171. <http://dx.doi.org/10.1037/0021-9010.61.2.166>.
- Lee, T.S. and Mumford, D., 2003. Hierarchical Bayesian inference in the visual cortex. *Journal of the Optical Society of America A*, [e-journal] 20(7), pp.1434–1448. <https://doi.org/10.1364/JOSAA.20.001434>.

- Levin, L.A., Nilsson, S.F.E., Ver Hoeve, J. and Wu, S. eds., 2011. *Adler's Physiology of the Eye*. 11th ed. London: Elsevier Health Sciences.
- Levy, M. and Weitz, B.A., 2012. *Retailing management*. 8th ed. New York, NY: McGraw-Hill Irwin.
- Locke, E.A. and Latham, G.P., 2002. Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, [e-journal] 57(9), pp.705–717. <http://dx.doi.org/10.1037/0003-066X.57.9.705>.
- Lohse, G.L. and Wu, D.J., 2001. Eye Movement Patterns on Chinese Yellow Pages Advertising. *Electronic Markets*, [e-journal] 11(2), pp.87–96. <https://doi.org/10.1080/101967801300197007>.
- Lohse, G.L., 1997. Consumer Eye Movement Patterns on Yellow Pages Advertising. *Journal of Advertising*, [e-journal] 26(1), pp.61–73. <https://doi.org/10.1080/00913367.1997.10673518>.
- Loschky, L.C., Nuthmann, A., Fortenbaugh, F.C. and Levi, D.M., 2017. Scene perception from central to peripheral vision. *Journal of Vision*, [e-journal] 17(1), pp.1–5. <http://doi.org/10.1167/17.1.6>.
- Lynch, Jr., J.G. and Srull, T.K., 1982. Memory and Attentional Factors in Consumer Choice: Concepts and Research Methods. *Journal of Consumer Research*, [e-journal] 9(1), pp.18–37. <https://doi.org/10.1086/208893>.
- Majaranta, P. and Bulling, A., 2014. Eye Tracking and Eye-Based Human–Computer Interaction. In: S.H. Fairclough and K. Gilleade, eds. 2014. *Advances in Physiological Computing*. London: Springer. Ch.3.
- March, J.G. and Heath, C., 1994. *A primer on decision making: how decisions happen*. New York, NY: Free Press.
- Massara, F., Liu, S.S. and Melara, R.D., 2010. Adapting to a retail environment: Modeling consumer-environment interactions. *Journal of Business Research*, [e-journal] 63(7), pp.673–681. <https://doi.org/10.1016/j.jbusres.2009.05.004>.
- Matthews, B. and Ross, L., 2010. *Research methods: a practical guide for the social sciences*. Harlow: Pearson Education Limited.
- Mehrabian, A. and Russell, J.A., 1974. *An approach to environmental psychology*. Cambridge, MA: The MIT Press.

- Mintel, 2019. *Pub visiting – UK – May 2019*. [online] Available at: <http://academic.mintel.com/display/920722/> [Accessed 20 May 2019].
- Moore, D. and Services, B.M., 1986. Brand Familiarity and Advertising: Effects On The Evoked Set And Brand Preference. In: R.J. Lutz, ed. 1986. *NA – Advances in Consumer Research Volume 13*. Provo, UT: Association for Consumer Research. pp.637–642.
- Moore, W.L. and Lehmann, D.R., 1980. Individual Differences in Search Behavior for a Nondurable. *Journal of Consumer Research*, [e-journal] 7(3), pp.296–307. <http://dx.doi.org/10.1086/208817>.
- Nedungadi, P., 1990. Recall and Consumer Consideration Sets: Influencing Choice without Altering Brand Evaluations. *Journal of Consumer Research*, [e-journal] 17(3), pp.263–276. <https://doi.org/10.1086/208556>.
- O’Leary-Kelly, A.M., Martocchio, J.J. and Frink, D.D., 1994. A Review of the Influence of Group Goals on Group Performance. *Academy of Management Journal*, [e-journal] 37(5), pp.1285–1301. <http://doi.org/10.5465/256673>.
- Olsen, A., 2012. *The Tobii I-VT Fixation Filter*. [pdf] Tobii Technology. Available at: https://stemedhub.org/resources/2173/download/Tobii_WhitePaper_TobiiI-VTFixationFilter.pdf [Accessed 22 April 2019].
- Oppewal, H. and Koelemeijer, K., 2005. More choice is better: Effects of assortment size and composition on assortment evaluation. *International Journal of Research in Marketing*, [e-journal] 22(1), pp.45–60. <https://doi.org/10.1016/j.ijresmar.2004.03.002>.
- Orquin, J.L. and Holmqvist, K., 2018. Threats to the validity of eye-movement research in psychology. *Behavior Research Methods*, [e-journal] 50(4), pp.1645–1656. <https://doi.org/10.3758/s13428-017-0998-z>.
- Orquin, J.L. and Mueller Loose, S., 2013. Attention and choice: A review on eye movements in decision making. *Acta Psychologica*, [e-journal] 144(1), pp.190–206. <https://doi.org/10.1016/j.actpsy.2013.06.003>.
- Otterbring, T., Wästlund, E., Gustafsson, A. and Shams, P., 2014. Vision (im)possible? The effects of in-store signage on customers’ visual attention. *Journal of Retailing and Consumer Services*, [e-journal] 21(5), pp.676–684. <https://doi.org/10.1016/j.jretconser.2014.05.002>.

- Palmer, J., Ames, C.T. and Lindsey, D.T., 1993. Measuring the effect of attention on simple visual search. *Journal of Experimental Psychology: Human Perception and Performance*, [e-journal] 19(1), pp.108–130. <https://doi.org/10.1037/0096-1523.19.1.108>.
- Park, C.W. and Lessig, V.P., 1981. Familiarity and Its Impact on Consumer Decision Biases and Heuristics. *Journal of Consumer Research*, [e-journal] 8(2), pp.223–230. <https://doi.org/10.1086/208859>.
- Park, C.W., Iyer, E.S. and Smith, D.C., 1989. The Effects of Situational Factors on In-Store Grocery Shopping Behavior: The Role of Store Environment and Time Available for Shopping. *Journal of Consumer Research*, [e-journal] 15(4), pp.422–433. <https://doi.org/10.1086/209182>.
- Peter, J.P. and Olson, J.C., 2010. *Consumer behavior & marketing strategy*. New York, NY: McGraw-Hill Irwin.
- Peterson, E.B., Thomsen, S., Lindsay, G. and John, K., 2010. Adolescents' Attention to Traditional and Graphic Tobacco Warning Labels: An Eye-Tracking Approach. *Journal of Drug Education*, [e-journal] 40(3), pp.227–244. <https://doi.org/10.2190/DE.40.3.b>.
- Pieters, R. and Warlop, L., 1999. Visual attention during brand choice: The impact of time pressure and task motivation. *International Journal of Research in Marketing*, [e-journal] 16(1), pp.1–16. [https://doi.org/10.1016/S0167-8116\(98\)00022-6](https://doi.org/10.1016/S0167-8116(98)00022-6).
- Pieters, R. and Wedel, M., 2004. Attention Capture and Transfer in Advertising: Brand, Pictorial, and Text-Size Effects. *Journal of Marketing*, [e-journal] 68(2), pp.36–50. <https://doi.org/10.1509/jmkg.68.2.36.27794>.
- Pieters, R. and Wedel, M., 2007. Goal Control of Attention to Advertising: The Yarbus Implication. *Journal of Consumer Research*, [e-journal] 34(2), pp.224–233. <https://doi.org/10.1086/519150>.
- Pieters, R. and Wedel, M., 2008. Informativeness of Eye Movements for Visual Marketing – Six Cornerstones. In: M. Wedel and R. Pieters, eds. 2008. *Visual marketing: From attention to action*. New York, NY: Lawrence Erlbaum Associates. Ch.3.
- Pieters, R., Rosbergen, E. and Hartog, M., 1995. Visual attention to advertising: The impact of motivation and repetition. In: K. P. Corfman and J.G. Lynch Jr., eds. 1996. *NA – Advances in Consumer Research Volume 23*. Provo, UT: Association for Consumer Research. pp.242–248.

- Pieters, R., Rosbergen, E. and Wedel, M., 1999. Visual Attention to Repeated Print Advertising: A Test of Scanpath Theory. *Journal of Marketing Research*, [e-journal] 36(4), pp.424–438. <http://dx.doi.org/10.2307/3151998>.
- Pieters, R., Warlop, L. and Wedel, M., 2002. Breaking Through the Clutter: Benefits of Advertisement Originality and Familiarity for Brand Attention and Memory. *Management Science*, [e-journal] 48(6), pp.765–781. <https://doi.org/10.1287/mnsc.48.6.765.192>.
- POPAI, 2014. *Mass Merchant Shopper Engagement Study: Media Report*. [pdf] POPAI. Available at: <https://www.shopassociation.org> [Accessed 10 April 2019].
- Posner, M.I., 1980. Orienting of attention. *Quarterly Journal of Experimental Psychology*, [e-journal] 32(1), pp.3–25. <https://doi.org/10.1080/00335558008248231>.
- Radach, R., Lemmer, S., Vorstius, C., Heller, D. and Radach, K., 2003. Eye Movements in the Processing of Print Advertisements. In: J. Hyönä, R. Radach and H. Deubel, eds. 2003. *The mind's eye: cognitive and applied aspects of eye movement research*. London: Elsevier. Ch.27.
- Rama, M.R.K., 2011. *Services marketing*. 2nd ed. New Delhi: Pearson.
- Ratneshwar, S., Pechmann, C. and Shocker, A.D., 1996. Goal-Derived Categories and the Antecedents of Across-Category Consideration. *Journal of Consumer Research*, [e-journal] 23(3), pp.240–250. <https://doi.org/10.1086/209480>.
- Rayner, K. and Castelano, M.S., 2008. Eye Movements during Reading, Scene Perception, Visual Search, and While Looking at Print Advertisements. In: M. Wedel and R. Pieters, eds. 2008. *Visual marketing: From attention to action*. New York, NY: Lawrence Erlbaum Associates. Ch.2.
- Rayner, K., 1998. Eye movements in reading and information processing: 20 years of research. *Psychological Bulletin*, [e-journal] 124(3), pp.372–422. <http://dx.doi.org/10.1037//0033-2909.124.3.372>.
- Rayner, K., Miller, B. and Rotello, C.M., 2008. Eye movements when looking at print advertisements: the goal of the viewer matters. *Applied Cognitive Psychology*, [e-journal] 22(5), pp.697–707. <https://doi.org/10.1002/acp.1389>.
- Rayner, K., Rotello, C.M., Stewart, A.J., Keir, J. and Duffy, S.A., 2001. Integrating text and pictorial information: Eye movements when looking at print advertisements. *Journal of Experimental Psychology: Applied*, [e-journal] 7(3), pp.219–226. <http://dx.doi.org/10.1037/1076-898X.7.3.219>.

- Reale, S. and Flint, S.W., 2016. The Impact of Menu Label Design on Visual Attention, Food Choice and Recognition: An Eye Tracking Study. *Journal of Sensory Studies*, [e-journal] 31(4), pp.328–340. <https://doi.org/10.1111/joss.12216>.
- Reid, R. and Brown, S., 1996. I hate shopping! An introspective perspective. *International Journal of Retail & Distribution Management*, [e-journal] 24(4), pp.4–16. <https://doi.org/10.1108/09590559610119910>.
- Reutskaja, E., Nagel, R., Camerer, C.F. and Rangel, A., 2011. Search Dynamics in Consumer Choice under Time Pressure: An Eye-Tracking Study. *The American Economic Review*, [e-journal] 101(2), pp.900–926. <https://doi.org/10.1257/aer.101.2.900>.
- Rheingold, H.L., 1985. Development as the Acquisition of Familiarity. *Annual Review of Psychology*, [e-journal] 36(1), pp.1–18. <https://doi.org/10.1146/annurev.ps.36.020185.000245>.
- Richardson, D. and Spivey, M., 2008. Eye Tracking: Characteristics and Methods. In: G.E. Wnek and G.L. Bowlin, eds. 2008. *Encyclopedia of Biomaterials and Biomedical Engineering (Volume 2)*. 2nd ed. Boca Raton, FL: CRC Press. pp.1028–1032.
- Riedl, R., Brandstätter, E. and Roithmayr, F., 2008. Identifying decision strategies: A process- and outcome-based classification method. *Behavior Research Methods*, [e-journal] 40(3), pp.795–807. <https://doi.org/10.3758/BRM.40.3.795>.
- Ross, I., 1979. Book Review: An Information Processing Theory of Consumer Choice. *Journal of Marketing*, [e-journal] 43(3), pp.124–126. <http://dx.doi.org/10.2307/1250155>.
- Russell, G.J., Ratneshwar, S., Shocker, A.D., Bell, D., Bodapati, A., Degeratu, A., Hildebrandt, L., Kim, N., Ramaswami, S. and Shankar, V.H., 1999. Multiple-Category Decision-Making: Review and Synthesis. *Marketing Letters*, [e-journal] 10(3), pp.319–332. <https://doi.org/10.1023/A:1008143526174>.
- Russo, J.E. and Leclerc, F., 1994. An Eye-Fixation Analysis of Choice Processes for Consumer Nondurables. *Journal of Consumer Research*, [e-journal] 21(2), pp.274–290. <https://doi.org/10.1086/209397>.
- Saunders, M.N.K., Lewis, P. and Thornhill, A., 2016. *Research methods for business students*. 7th ed. Harlow: Pearson Education Limited.
- Schotter, E.R., Berry, R.W., McKenzie, C.R.M. and Rayner, K., 2010. Gaze bias: Selective encoding and liking effects. *Visual Cognition*, [e-journal] 18(8), pp.1113–1132. <https://doi.org/10.1080/13506281003668900>.

- Sekaran, U. and Bougie, R., 2016. *Research methods for business: a skill-building approach*. 7th ed. Chichester: John Wiley & Sons.
- Simon, H.A., 1955. A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics*, [e-journal] 69(1), pp.99–118. <https://doi.org/10.2307/1884852>.
- Slote, M., 1989. *Beyond optimizing: a study of rational choice*. Cambridge, MA: Harvard University Press.
- Starch, D., 1966. *Measuring Advertising Readership and Results*. New York, NY: McGraw-Hill.
- Titus, P.A. and Everett, P.B., 1995. The Consumer Retail Search Process: A Conceptual Model and Research Agenda. *Journal of the Academy of Marketing Science*, [e-journal] 23(2), pp.106–119. <http://doi.org/10.1177/0092070395232003>.
- Tobii AB, 2018. *Tobii Pro Glasses 2. Product Description*. [pdf] Tobii AB. Available at: <https://www.tobii.com/siteassets/tobii-pro/product-descriptions/tobii-pro-glasses-2-product-description.pdf> [Accessed 10 April 2019].
- Tonkin, C., Ouzts, A.D. and Duchowski, A.T., 2011. Eye tracking within the packaging design workflow. In: *Conference on Novel Gaze-Controlled Applications*. Karlskrona, Sweden, 26-27 May 2011. New York, NY: ACM.
- Treistman, J. and Gregg, J.P., 1979. Visual, Verbal, and Sales Responses to Print Ads. *Journal of Advertising Research*, [e-journal] 19(4), pp.41–47. Available through: Anglia Ruskin University Library website [Accessed 30 September 2019].
- Tsotsos, J.K., 1990. Analyzing vision at the complexity level. *Behavioral and Brain Sciences*, [e-journal] 13(3), pp.423–445. <https://doi.org/10.1017/S0140525X00079577>.
- Turley, L.W. and Milliman, R.E., 2000. Atmospheric Effects on Shopping Behavior. *Journal of Business Research*, [e-journal] 49(2), pp.193–211. [https://doi.org/10.1016/S0148-2963\(99\)00010-7](https://doi.org/10.1016/S0148-2963(99)00010-7).
- Tversky, A. and Kahneman, D., 1974. Judgment under Uncertainty: Heuristics and Biases. *Science*, [e-journal] 185(4157), pp.1124–1131. <https://doi.org/10.1126/science.185.4157.1124>.
- Van der Laan, L.N., Hooge, I.T.C., de Ridder, D.T.D., Viergever, M.A. and Smeets, P.A.M., 2015. Do you like what you see? The role of first fixation and total fixation duration in consumer choice. *Food Quality and Preference*, [e-journal] 39, pp.46–55. <https://doi.org/10.1016/j.foodqual.2014.06.015>.

- Van der Lans, R., Pieters, R. and Wedel, M., 2008a. Competitive Brand Salience. *Marketing Science*, [e-journal] 27(5), pp.922–931. <https://doi.org/10.1287/mksc.1070.0327>.
- Van Der Lans, R., Pieters, R. and Wedel, M., 2008b. Eye-Movement Analysis of Search Effectiveness. *Journal of the American Statistical Association*, [e-journal] 103(482), pp.452–461. <https://doi.org/10.1198/016214507000000437>.
- Wade, N.J., 2010. Pioneers of Eye Movement Research. *i-Perception*, [e-journal] 1(2), pp.33–68. <https://doi.org/10.1068/i0389>.
- Wade, N.J., 2015. How Were Eye Movements Recorded Before Yarbus? *Perception*, [e-journal] 44(8–9), pp.851–883. <https://doi.org/10.1177/0301006615594947>.
- Wästlund, E., Otterbring, T., Gustafsson, A. and Shams, P., 2015. Heuristics and resource depletion: eye-tracking customers' in situ gaze behavior in the field. *Journal of Business Research*, [e-journal] 68(1), pp.95–101. <https://doi.org/10.1016/j.jbusres.2014.05.001>.
- Wästlund, E., Shams, P. and Otterbring, T., 2018. Unsold is unseen ... or is it? Examining the role of peripheral vision in the consumer choice process using eye-tracking methodology. *Appetite*, [e-journal] 120, pp.49–56. <https://doi.org/10.1016/j.appet.2017.08.024>.
- Wedel, M. and Pieters, R., 2006. *Eye Tracking for Visual Marketing. Foundations and Trends® in Marketing*. Hanover, MA: Now Publishers Inc.
- Wedel, M. and Pieters, R., 2008a. A review of eye-tracking research. In: N.K. Malhotra, ed. 2008. *Review of Marketing Research (Volume 4)*. Bingley: Emerald Group Publishing Limited. Ch.5.
- Wedel, M. and Pieters, R., 2008b. Introduction to Visual Marketing. In: M. Wedel and R. Pieters, eds. 2008. *Visual marketing: From attention to action*. New York, NY: Lawrence Erlbaum Associates. Ch.1.
- Wedel, M., Pieters, R. and Liechty, J., 2008. Attention switching during scene perception: How goals influence the time course of eye movements across advertisements. *Journal of Experimental Psychology: Applied*, [e-journal] 14(2), pp.129–138. <https://doi.org/10.1037/1076-898X.14.2.129>.
- Westheimer, G., 2007. Eye movement research in the 1950s. In: R.P.G. Van Gompel, M.H. Fischer, W.S. Murray and R.L. Hill, eds. 2007. *Eye movements: a window on mind and brain*. Oxford: Elsevier. Ch.3.

- Wilkinson, J.B., Mason, J.B. and Paksoy, C.H., 1982. Assessing the Impact of Short-Term Supermarket Strategy Variables. *Journal of Marketing Research*, [e-journal] 19(1), pp.72–86. <https://doi.org/10.1177/002224378201900107>.
- Wood, R.E., Mento, A.J. and Locke, E.A., 1987. Task complexity as a moderator of goal effects: A meta-analysis. *Journal of Applied Psychology*, [e-journal] 72(3), pp.416–425. <http://dx.doi.org/10.1037/0021-9010.72.3.416>.
- Wood, S.L. and Lynch, J.G., 2002. Prior Knowledge and Complacency in New Product Learning. *Journal of Consumer Research*, [e-journal] 29(3), pp.416–426. <https://doi.org/10.1086/344425>.
- Yarbus, A.L., 1965. *Eye Movements and Vision*. Translated from Russian by B. Haigh. New York, NY: Plenum Press.
- Young, S., 2000. Putting the Pieces Together at the Point of Sale. *Marketing Research*, 12(3), pp.32–36. Available through: Anglia Ruskin University Library website [Accessed 1 September 2018].
- Zajonc, R.B., 1968. Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, [e-journal] 9(2), pp.1–27. <http://dx.doi.org/10.1037/h0025848>.
- Zhang, J., Wedel, M. and Pieters, R., 2009. Sales effects of attention to feature advertisements: a Bayesian mediation analysis. *Journal of Marketing Research*, [e-journal] 46(5), pp.669–681. <https://doi.org/10.1509/jmkr.46.5.669>.

7. APPENDICES

7.1. QUESTIONNAIRE

Prior to the purchase task:

1. Your age?

- 20 – 24
- 25 – 29
- 30 – 34
- 35 – 39

2. Your sex?

- Male
- Female
- Prefer not to answer

3. How often do you visit this venue?

- Twice a week or more
- About once a week
- About once a fortnight
- About once a month
- Less than once a month
- This is my first time

4. Please enter the brand you are planning to buy today or leave blank if undecided

- _____

After the purchase task:

5. What brand did you choose?

- _____

7.2. DATA ANALYSIS OUTPUTS FROM R PER HYPOTHESIS

7.2.1. H1A: GREATER FAMILIARITY WITH THE PUB VENUE REDUCES VISUAL ATTENTION TO THE IN-STORE ENVIRONMENT

7.2.1.1. PROPORTION OF AOIs SEEN

Mean and standard deviation

| | Mean | Standard Deviation |
|-------------------|-------|--------------------|
| First Time | 46.67 | 17.11 |
| Occasional | 47.50 | 16.82 |
| Regular | 46.37 | 16.08 |

ANOVA output

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|----------------------------------------------------------------------|-----|--------|---------|---------|--------|
| Proportion of AOIs seen | 2 | 0.004 | 0.002 | 0.073 | 0.93 |
| Residuals | 173 | 4.865 | 0.028 | | |
| Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | | |

7.2.1.2. VISIT COUNT

Mean and standard deviation

| | Mean | Standard Deviation |
|-------------------|------|--------------------|
| First Time | 5.63 | 6.60 |
| Occasional | 4.34 | 5.35 |
| Regular | 3.97 | 3.75 |

ANOVA output

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|----------------------------------------------------------------------|-----|----------|---------|---------|--------|
| Visit count | 2 | 81.843 | 40.922 | 1.331 | 0.267 |
| Residuals | 173 | 5320.293 | 30.753 | | |
| Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | | |

7.2.2. H1B: GREATER FAMILIARITY WITH THE PUB VENUE REDUCES VISUAL ATTENTION TO BEER BRANDS AT THE POINT OF PURCHASE

*7.2.2.1. PROPORTION OF AOIs SEEN**Mean and standard deviation*

| | Mean | Standard Deviation |
|-------------------|-------|--------------------|
| First Time | 51.15 | 27.10 |
| Occasional | 41.98 | 21.87 |
| Regular | 38.65 | 24.09 |

ANOVA output

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|----------------------------------------------------------------------|-----|--------|---------|---------|---------|
| Proportion of AOIs seen | 2 | 0.416 | 0.208 | 3.554 | 0.031 * |
| Residuals | 166 | 9.714 | 0.059 | | |
| Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | | |

Tukey's HSD output

95% family-wise confidence level

| | diff | lwr | upr | p adj |
|-----------------------------------|-------|--------|-------|-------|
| Occasional- Regular | 0.033 | -0.086 | 0.153 | 0.788 |
| First Time- Regular | 0.125 | -0.001 | 0.251 | 0.052 |
| First Time- Occasional | 0.092 | -0.007 | 0.191 | 0.076 |

*7.2.2.2. TOTAL FIXATION DURATION**Mean and standard deviation*

| | Mean | Standard Deviation |
|-------------------|-------|--------------------|
| First Time | 10.11 | 10.38 |
| Occasional | 6.05 | 5.58 |
| Regular | 5.13 | 5.94 |

ANOVA output

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|----------------------------------------------------------------------|-----|--------|---------|---------|----------|
| Total fixation duration | 2 | 733.5 | 366.74 | 6.301 | 0.002 ** |
| Residuals | 166 | 9661 | 58.20 | | |
| Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | | |

Tukey's HSD output

95% family-wise confidence level

| | diff | lwr | upr | p adj |
|-----------------------------------|-------------|------------|------------|--------------|
| Occasional- Regular | 0.920 | -2.861 | 4.700 | 0.833 |
| First Time- Regular | 4.985 | 1.012 | 8.958 | 0.010 |
| First Time- Occasional | 4.065 | 0.945 | 7.185 | 0.007 |

*7.2.2.3. FIRST FIXATION ON FINAL CHOICE**Mean and standard deviation*

| | Mean | Standard Deviation |
|-------------------|-------------|---------------------------|
| First Time | 6.09 | 7.32 |
| Occasional | 6.46 | 7.97 |
| Regular | 4.42 | 5.20 |

ANOVA output

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|----------------------------------------------------------------------|-----------|---------------|----------------|----------------|------------------|
| First fixation on final choice | 2 | 92.477 | 46.238 | 0.874 | 0.419 |
| Residuals | 153 | 8093.747 | 52.900 | | |
| Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | | |

7.2.2.4. TOTAL FIXATION DURATION ON A CHOSEN PRODUCT

Mean and standard deviation

| | Mean | Standard Deviation |
|-------------------|------|--------------------|
| First Time | 2.59 | 2.87 |
| Occasional | 1.71 | 2.07 |
| Regular | 1.12 | 1.22 |

ANOVA output

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|----------------------------------------------------------------------|-----|---------|---------|---------|---------|
| Total fixation duration on a chosen product | 2 | 47.065 | 23.533 | 4.596 | 0.012 * |
| Residuals | 153 | 783.405 | 5.120 | | |
| Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | | |

7.2.3. H2: A SPECIFIC SHOPPING GOAL REDUCES VISUAL ATTENTION TO BEER BRANDS AT POINT OF PURCHASE

7.2.3.1. PROPORTION OF AOIS SEEN

Mean and standard deviation

| | Mean | Standard Deviation |
|-----------------------|-------|--------------------|
| Specific goal | 37.98 | 21.59 |
| Ambiguous goal | 49.82 | 25.64 |

Welch's t-test

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| $t = 3.258$, $df = 166.84$, $p\text{-value} = 0.001$ alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: | |
| 0.047 | 0.190 |
| sample estimates: | |
| mean of x [Ambiguous goal] 0.498 | mean of y [Specific goal] 0.380 |

*7.2.3.2. TOTAL FIXATION DURATION**Mean and standard deviation*

| | Mean | Standard Deviation |
|-----------------------|------|--------------------|
| Specific goal | 5.55 | 6.56 |
| Ambiguous goal | 8.67 | 8.57 |

Welch's t-test

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| $t = 2.682$, $df = 166.32$, $p\text{-value} = 0.008$ alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: | |
| 0.824 | 5.422 |
| sample estimates: | |
| mean of x [Ambiguous goal] 8.673 | mean of y [Specific goal] 5.550 |

*7.2.3.3. FIRST FIXATION ON FINAL CHOICE**Mean and standard deviation*

| | Mean | Standard Deviation |
|-----------------------|------|--------------------|
| Specific goal | 4.29 | 4.75 |
| Ambiguous goal | 7.27 | 8.60 |

Welch's t-test

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| $t = 2.742$, $df = 136.94$, $p\text{-value} = 0.007$ alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: | |
| 0.832 | 5.132 |
| sample estimates: | |
| mean of x [Ambiguous goal] 7.267 | mean of y [Specific goal] 4.286 |

*7.2.3.4. TOTAL FIXATION DURATION ON A CHOSEN PRODUCT**Mean and standard deviation*

| | Mean | Standard Deviation |
|-----------------------|------|--------------------|
| Specific goal | 1.14 | 1.24 |
| Ambiguous goal | 2.52 | 2.77 |

Welch's t-test

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| $t = 4.147$, $df = 122.66$, $p\text{-value} = 6.225e^{-05}$ alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: | |
| 0.722 | 2.041 |
| sample estimates: | |
| mean of x [Ambiguous goal] 2.517 | mean of y [Specific goal] 1.135 |

7.2.4. H3: INCREASED VISUAL ATTENTION TO A BRAND LEADS TO AN INCREASED LIKELIHOOD OF IT BEING CHOSEN

7.2.4.1. TOTAL FIXATION DURATION ON A CHOSEN VS NON-CHOSEN PRODUCT

Mean and standard deviation

| | Mean | Standard Deviation |
|-------------------|------|--------------------|
| Chosen | 1.90 | 2.31 |
| Non-chosen | 0.80 | 0.77 |

Paired t-test

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| t = 7.05, df = 155, p-value = $5.556e^{-11}$ alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: | |
| 0.791 | 1.406 |
| sample estimates: mean of the differences 1.098 | |

7.2.4.2. VISIT COUNT ON A CHOSEN VS NON-CHOSEN PRODUCT

Mean and standard deviation

| | Mean | Standard Deviation |
|-------------------|------|--------------------|
| Chosen | 3.39 | 3.00 |
| Non-chosen | 2.30 | 1.51 |

Paired t-test

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| $t = 5.88$, $df = 155$, $p\text{-value} = 2.438e^{-08}$ alternative hypothesis: true difference in means is not equal to 0 95 percent confidence interval: | |
| 0.724 | 1.457 |
| sample estimates: mean of the differences 1.09 | |

*7.2.4.3. NOTING ORDER**Frequency table*

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|------------------------------------|-------|-------|-------|-------|------|------|------|------|------|------|------|----|------|
| 15.38 | 10.90 | 12.18 | 19.87 | 11.54 | 7.69 | 7.69 | 8.33 | 1.92 | 2.56 | 0.64 | 0.64 | 0 | 0.64 |
| Top: Position Bottom: Frequency | | | | | | | | | | | | | |

Pearson's chi-squared test

| |
|--------------------------------------------------------------------------------------------------------------|
| data: Noting order of chosen values $X\text{-squared} = 88$, $df = 11$, $p\text{-value} = 4.106e^{-14}$ |
|--------------------------------------------------------------------------------------------------------------|